5-24-2012

Vilém Flusser's Media Philosophy: Tracing the Digital in Nature through Art

Anne Popiel
Washington University in St. Louis

WASHINGTON UNIVERSITY IN ST. LOUIS

Department of Germanic Languages and Literatures

Dissertation Examination Committee:
Lutz Koepnick, Chair
Matthew Erlin
Claude Evans
Jennifer Kapczynski
Erin McGlothlin
Anca Parvulescu

Vilém Flusser's Media Philosophy:
Tracing the Digital in Nature through Art

by

Anne Marie Popiel

A dissertation presented to the
Graduate School of Arts and Sciences
of Washington University in
partial fulfillment of the
requirements for the degree
of Doctor of Philosophy

May 2012

Saint Louis, Missouri

Acknowledgements

I would like to extend my sincerest thanks to those individuals and institutions whose generous assistance made this dissertation possible. I am grateful for the support and opportunities from Washington University in St. Louis and the Department of Germanic Languages and Literatures in particular. Lutz Koepnick was a caring advisor who allowed me the freedom to experiment and challenged me to broaden my perspective. Matthew Erlin painstakingly edited my prose and held me to a higher standard of clarity. Erin McGlothlin and Jennifer Kapczynski kindly provided thought-provoking questions, and Claude Evans and Anca Parvulescu granted me their crucial outside perspectives and helpful suggestions for further research. I am indebted to their generosity.

My time at the Flusser Archiv Berlin directed by Siegfried Zielinski of the Universität der Künste was the foundation for my research. The extremely competent scientific supervisor Claudia Becker enabled my access to the archives and inspired an even deeper appreciation of Flusser's work. The Flusserian Philosophical Fridays discussion group with Rodrigo Novaes provided countless hours of fruitful engagement with a wide range of topics. The Freie Universität Berlin kindly funded my first year of research and made my stay a productive one.

My parents, sisters and extended family always encouraged my educational pursuits from the beginning and brought me to where I am now. Their enthusiasm and encouragement kept me going through the many setbacks that came up along the way, any one of which would have stopped me in my tracks were it not for their unending support.

Christopher Shaffer read my work in its entirety and believed in me from the very beginning. Nora Bayerer closely proofread sections of my work, Antoine Krieger and Robert Spengler provided valuable suggestions and a sense of humor, and Lisa Haegele and Cem Pahl held me up during the hardest times. My unending gratitude goes to these and to all of my friends who refused to let me give up.

Dedication

My deepest gratitude, love and respect is reserved for the memory of Kelly Keslar, a brilliant academic, insightful writer and dear friend who encouraged my ideas more than anyone else in the world, offered extremely generous comments and helpful advice for my writing and believed in me for no apparent reason. Although she will never see this final version, every page is dedicated to her. She was a blessing to me and to those who knew her and will never be forgotten. She lives on in every word I write.

Table of Contents

Introduction

Understanding Vilém Flusser

When Vilém Flusser (1920-1991) crossed the ocean between Europe and South America, his ties to the Old World were already broken. Leaving behind the Nazi occupation and virtually no surviving friends or family members, the Czech-German Jew and his wife Edith abandoned Prague for the urban jungles of Brazil, where all they had left was the future. Starting afresh in his New World, Flusser assembled his experiences, observations and truncated university education into a philosophical edifice that defies categories and disciplines even to this day. His reexamination of some of the most basic elements of human existence both mundane and terrifying offers his readers a glimpse of the world as if for the first time. Forcibly uprooted geographically, socially and culturally, Flusser developed a theoretical distance that stayed with him as he consistently attempted to unlearn his own previous knowledge and prejudices about things in order to perceive new information, establish new roots and constructively face the future. Flusser studied Brazil's nature and culture for years before making a deliberate choice to settle into foreign ground and forge new ties again from the beginning in an attempt to span the abyss of a life he perceived to be absurd. This constant awareness of a pervading *Bodenlosigkeit* allowed Flusser to remain always an outsider, and thus able to view the world's dramas through a detached eye, sensitive less to the emotional content and more to the dynamic organizational structures. Even his autobiography is to a large extent written in the third person; here he describes his perception of the war's destruction from his new Brazilian refuge:

> War man aber, wie jetzt, aus der Ordnung gerissen, dann konnte man die Welt aus weiter Sicht überblicken. Was man da erblickte, war keine Ordnung, sondern ein Chaos, auf das sich verschiedene, lächerliche und einander überschneidende Ordnungen drückten. Es war ein Vergnügen, zu beobachten, wie diese Ordnungen gleich Amöben in der chaotischen Nährsuppe herumschwammen, einander fraßen, sich teilten, und jede davon überzeugt zu sein schien, das Wesen der Suppe vorzustellen. (*Bodenlos* 36)

Flusser's self-described structural understanding of the world comes from a profound *Gleichgültigkeit* (*Bodenlos* 36), and yet it opens up to him an almost unlimited freedom to disentangle the parts and construct from them something new. This potential to create new relationships between things is for Flusser the only way to bridge the abyss of absurdity; we must first understand the structure of our world in order to make of its parts something meaningful. For Flusser, human freedom is this ability to create our own meaning.

The above excerpt by Flusser is representative of his writing style and of the object of this study. When Flusser's theoretical analyses break up human culture into its structural components, the result is often a metaphor linking the cultural phenomena with natural ones. This is strange because his philosophy to some extent begins from the perceived sense of alienation humans experience in relation to nature. Flusser's definition of culture, in fact, could be summarized as the technological engagement against nature for survival. The developmental progress of technology then increasingly abstracts humans from a direct experience of nature. Nature, on the other hand, is for Flusser the inevitability of death and the cycle of renewal that keeps all information in flux. Human cultural engagements, absurd as they are in Flusser's eyes, are for him failed attempts to attain immortality by preserving information after its creator's death in the form of artifacts that eventually crumble and fade. Although human bodies are

natural in that they succumb to death, Flusser believes humans' technology and "anti-natural" culture are also products of "natural" neuronal circuits in human brains, and thus culture is ultimately also "natural." In so mixing the concepts, Flusser explains that the distinction between nature and culture must be erased completely before humans can creatively rearrange the structural components of their environment. While Flusser holds technology responsible for the gap experienced between nature and culture, he sees in the transition to the digital an expanded creative potential that could very well bridge this gap—digital technology may be able to assist in creating more "natural" or "real" relationships between things. The following chapters will elucidate Flusser's writings to show that the incremental process whereby humans were distanced from their natural environment through the use of tools is the same process that developed technology to the point where it can finally connect humans more closely to their environment through unprecedented creative restructuring. This is only one of Flusser's many contributions, but one of the most important for understanding the potential applications of his work in the so-called digital age.

Given the increasing relevance and diversity of implications of Flusser's theories on the relationship of technology to the environment, it is surprising that previous scholarship has not yet treated in particular the looming presence of nature in Flusser's expansive collection of texts. Just in the published works alone, it is a rare text indeed that does not draw important conclusions for the manipulation of environments. This study will attempt to make explicit Flusser's thoughts on the connections between nature and culture that are directly and indirectly present throughout his work. Many of these connections have been overlooked because of Flusser's unusual writing style, the absence

of explicit citation of other thinkers who influenced him, and the fundamental interdisciplinary nature of his texts. Although essential to understanding Flusser's perspective, many of the connections exist only in his purposefully chosen metaphors and experimental thought-models that can easily be taken for granted when reading him solely for his more popular (equally groundbreaking) theories of language or media. Because few of his works were originally published in English, his work is only beginning to be recognized in scholarship outside of Germany and Brazil, where he is known as a media theorist and language philosopher, respectively. Flusser did tailor his writings to his audience, and in general published most of his early theories of language in Portuguese beginning in the 1960s, his media theory in German in the following decades, and turned to the United States in the later years to publish his theories concerning digital art and genetic manipulation, among others. This is an approximation; in all of these periods Flusser's nature metaphors are present and numerous, and still the entire discussion of nature in his philosophy of technology and art remains relatively untouched until now.

A large part of Flusser's conceptualization of nature in the digital age is indirectly evidenced in his predilection for metaphorical and allegorical writing. While this technique in his writing deserves to be explored in its own right, Flusser's unique way of picturing philosophy is even more intriguing for its subject matter, as the majority of images he uses to explain his concepts are taken from the natural world, as the above excerpt demonstrates. What is exciting about this is the fact that these plants, animals, rocks, water and body parts are used in Flusser's media philosophy to illustrate the function of digital technology in human society. The more one reads Flusser, the more

nature, humans and machines fuse into a mosaic of interrelated parts in a very mysterious yet purposeful way. As a form of translation between worlds, these nature metaphors are to be used as models for experience in a culture where nature has disappeared. Society's transition to a digital code Flusser shows to effect a crisis of science and of values in a time when the boundaries between philosophical critique, artistic practice and hard science can and should no longer be distinguished. Flusser's metaphorical philosophy illustrates this crisis in its performance of the new style of writing he envisions: no more claims to truth or to scientific accuracy than to creativity and varying degrees of improbability. The confusion of art, science and metaphorical creatures in Flusser's philosophy is a crucial part of the present examination of the vanishing nature-culture divide.

Flusser's metaphors require a somewhat unconventional approach in the writing of this dissertation for a number of reasons. Because his essayistic style of writing is always meant as a direct address toward his readers to provoke them and initiate a dialogue, my engagement with his writings is performative in the sense that it plays with this essayistic style, to some extent thinking with and along the lines of Flusser's work to create a deliberate encounter between subjective and objective viewpoints in the text. I not only dissect his metaphors and explain their implications, but then also answer in the form of a synthesis, exploring possible ways the metaphors can fit together and in so doing open up new directions for future dialogues. I stitch together these diverse and colorful metaphors in ways different than Flusser does in order to construct a larger picture of the universe they depict and the manner in which they do so. I deliberately overlap seemingly unrelated metaphors that actually refer to the same phenomenon upon

closer consideration, juxtaposing disparate terms in the same sentence to uncover their similarities—terms, for example, like "ocean of possibilities," "boiling soup of creation," "abyss of the inarticulable" and so on, all of which refer to the same concept of a chaotic flux of particles that have not yet congealed into meaningful information. These metaphors are always used in Flusser's sense and are not chosen arbitrarily for the sake of dramatic flair. The result is the development of a conclusion unforeseen at the beginning of this project: Flusser explicitly asserts his ideal of free human agency in world creation, while his metaphors implicitly assert the opposite. Because our second nature is both nature and culture, to recreate from its parts something new we must not only insert our deliberate intention into the process, but we must also work together with the chaos, chance and entropy of nature's methods. We really can only half-predict the outcome of our creative efforts, Flusser's metaphors show us, purposely creating spaces for order to spontaneously emerge.

This investigation began with the following questions: Why do the majority of Flusser's metaphors for digital technology come from nature? What relationship between nature and digital technology is implied by this literary device in his philosophy? It is my understanding that the use of these metaphors in Flusser's texts both illuminate crucial connections in the content of his philosophy as well as perform an important function exemplifying the possibilities he sees available to creative artists, philosophers and scientists once they understand their new relationship to their natural/cultural environment. They perform this new style of writing, and they also describe Flusser's theoretical vision of realities in which metaphors themselves act as tools or media in the formation of these second-nature realities. As each main metaphor is examined over the

course of this study, a structural diagram of this natural-digital relationship is filled in piece by piece, leading to further questions to be addressed such as: What is the role of metaphor in our perception of the environment, and in our culture of technology? What conclusions must be drawn for future creative responses to this understanding of the natural-digital connection? How might we re-imagine or even re-create our world?

The answers to these questions are revealed as the structure of Flusser's universe of ideas is outlined and unfolded into its web of interconnections. Flusser's worldview is so dependent on his use of metaphor that a thorough study of his theories can only develop simultaneously alongside an analysis of his metaphors. After all, Flusser does not clearly delineate anywhere a simple logical progression of ideas or summarize his ideas into a coherent whole. As Louis Bec once described his thought process, Flusser thinks in images, that is, structurally instead of linearly. "Vilém Flusser was convinced that philosophy no longer happened in writing, but in the image" (Bec "Institut" 4).[1] If Bec refers to Flusser's philosophy as the action of a map-maker surveying a terrain, the thought models that form along the way are mental images that orient the explorer. The contradiction is obvious, in that Flusser drew his images almost entirely in words, with almost no help from any diagrams, illustrations or nonverbal explanations of his own. If his texts really are cartographic tapestries interwoven with uncountable linear threads, then they act as examples of Flusser's own theories as explained in the following chapters. Reading Flusser is like walking a labyrinth: he writes so that we experience the journey, not that we may climb above and observe the whole blueprint all at once. The

---

1 My translation from the French.

present exploration of his theoretical universe, however, will attempt to take this impossible view.

Another difficulty in organizing Flusser's theoretical structures is the sheer amount of written material. His book-length works number around thirty and his essays well over 2,500 before taking into account the countless translations into multiple languages that, when translated by Flusser himself, as was often the case, suddenly became new works with slightly or even substantially different content.[2] The Flusser Archiv Berlin has most of these works available for viewing, along with Flusser's prolific written correspondence and his travel library where one can see, for example, the encyclopedia entry on octopi he consulted while writing the *Vampyroteuthis*. The essays, most written for art journals or newspapers like the *Suplemento Literário do Estado de São Paulo* in which Flusser kept a regular column for decades, are quite often substantially redundant. That is to say, while they are all unique, they usually repeat at least a portion of Flusser's main ideas in different contexts and with different emphases, adding to the pleasure of the researcher who might happen to discover in some particular permutation an unexpected connection between concepts. In the present study, only a selected representation of the materials supporting the views here have been cited to avoid redundancy, and an attempt was made to choose published works where possible for the convenience of the reader. There were many more to choose from.

Flusser's scattered ideas are synthesized here in pursuit of his vision of creative freedom. The first chapter begins with a deeper discussion of Flusser's concepts of

---

2 For more on Flusser's practice of translation and back-translation in text production, see Rainer Guldin's *Philosophieren zwischen den Sprachen. Vilém Flussers Werk*. München: Wilhelm Fink Verlag, 2005.

nature and culture, reading from his metaphors a new kind of nature incorporating human culture into what he terms a "second nature." Following this overview, the second chapter focuses on the most ambitious of Flusser's extended metaphors, the *Vampyroteuthis infernalis*, what he terms a work of philosophical fiction that confuses art and science with its parallels between chromatophores and pixels, ink clouds and advertising. The third chapter looks at the function of metaphor in Flusser's theories of human perception and concept formation, and its role in an age of high technology where literary metaphors and deterministic machines combine for a new kind of artistic creation that utilizes emergent order in chaos. The fourth and final chapter supports the artistic application of emergent principles by connecting Flusser's concepts of nature, digital and non-digital technology at the level of the atom, detailing the metaphors linking digital information bits to piles of dirt and stones. This leads to an extension of Flusser's theories to selected artworks by Franz Ackermann, Joan Fontcuberta and even living artworks by bio artists like Eduardo Kac, Louis Bec, Oron Catts and Ionat Zurr and others. Once nature can be manipulated at the level of the gene, Flusser believes, it is material for art just like pixels, numbers and metaphors. A combination of nature and culture, art and science, the future of alternative world creation draws nearer every day; Flusser's response to groundlessness is to create one's own ground out of thin air, modeled by oceans, squids, spider webs and sand.

I: Oceans

Connecting Nature, Culture and the Telematic Universe to Build Worlds

Mapping Flusser's scattered musings onto his larger theoretical framework is indeed a challenging task, despite his many bold statements on the most fundamental topics of human birth, life, death, and everything in between. Each of his works contains multiple theoretical layers, different linguistic contexts and various references to his other works, and each fits into his broader worldview as a separate layer which must be translated and meshed with all the others in order to present the entire picture. Flusser's universe as a whole is present in none of his works, and in all of them. Beginning to crudely filter the information, however, first reveals that Flusser's vision of present and future human culture in large part seems to depend upon humans' relationship to the natural environment. In particular this vision emphasizes the dissolving of conceptual and physical boundaries between nature and culture.

A Second Nature

Flusser blurs the line between the two spheres based not only on the equation of nature and culture as simply one and the same environment, but also on the juxtaposition of the two as completely opposed worlds. Because Flusser's examinations are always unapologetically anthropocentric, nature and culture are always defined in relation to people, and humans as creators of culture are to be understood in this sense as both natural and anti-natural beings. It is this contradiction that only gradually reveals itself to explain humans' relationship with digital technology and therefore their task for a digital future. Humans are natural, so to speak, in that they are well-connected parts of the "united world memory" (explained below), an interrelated web-like ecosystem containing

the biosphere, human beings, their tools and the rest of the universe all made up of the same basic elements. This is important because if the same particles make up all things, then they can be rearranged at will to create new hybrids as far as technology allows. Therefore, Flusser urges, humans must acknowledge their place in nature's network of relations so that they can manipulate it more competently. Human beings are at the same time also very much unnatural, Flusser adds, as creators of a culture meant to deny the basic conditions of the natural mortal world, an attempt to avoid death and meaninglessness by preserving and circulating information in purposeful ways. To do this, and always by means of technology, humans create a distance between themselves and nature which they then continually struggle to overcome, eventually creating a new kind of nature to replace the old. The result is a kind of "second nature" that is simultaneously both nature and culture. To direct our culture's technology toward the best possible future, Flusser implores that we first understand how our second nature is structured so that we may change it freely according to our wishes.

The urgency in his writing comes mainly during the 1970s and 1980s when digital technology was just starting to explode cultural horizons and the potential for emancipation as well as the ethical implications were hardly yet fathomed. Personal computers were just starting to appear on the market, and photo-editing programs and the internet were only just available to the public around 1990, a year before Flusser's death. While his almost prescient foresight of a networked society and image manipulation were indeed visionary at the time, they are perhaps all the more relevant a few decades later, when the dangers and promises of digital culture are even more real and our relationship to the environment even more controversial. In the twenty-first century, the importance

of nature in all its forms can no longer be overlooked in these considerations on the place of technology in society.

Defining nature and culture as they are used in Flusser's texts proves the first challenge. Most of Flusser's writing places human culture in the foreground, negatively defined against the mere backdrop or shadow of nature, and even his studied observations of nature as nature in the end reveal to him again only the products of human culture. Taking from his perspective a negative image, though, it is possible to outline at this point a working definition of nature, not disregarding the fact that such an undertaking may well never break free of its cultural dimensions entirely. Nature, the reader may gather, was always around, present on earth before humans existed. As such, it provides the most basic conditions for our existence and limits our growth and thus our actions and even our thoughts. Both characteristics of nature are of course already defined in relation to the human. More definitively, nature is to be seen as a randomly organized system, a web of multiple non-symbolic games whose rules are governed by chance. The playing pieces in this game of chance are particles, atomic, subatomic or otherwise, that constantly circulate throughout the physical world. Now more densely packed together, now more loosely packed, the particles create information by clumping together temporarily, only to dissipate again as the information is lost. In the end, the basic characteristic of nature is that these particles will eventually drift so far away from each other that no more information can be created, that is, nature is entropy and death.

Human culture in general, then, can be defined as the struggle against this nature, against oblivion, meaninglessness and death—but it is never only unnatural. The key to a comprehensive view of his understanding of nature and culture in the digital age for the

purposes of this study I believe can be found in his 1990 *Leonardo* essay, "On Memory

(Electronic or Otherwise)," in the juncture of two seemingly contradictory statements:

one describing human cultural production as specifically "anti-natural" followed

immediately by a proclamation that nothing human is "opposed to nature":

> Humans are different from all other known beings in that they acquire
> information, store it, process it and transmit it to future generations. This is anti-
> natural in that it is against the entropy of nature. This unique human ability has
> been covered up during history by a dense ideological fog that has prevented
> people from making full use of it. The most pernicious ideology was the one that
> led us to believe that we have (or are) something opposed to nature. The invention
> of electronic memories has given us a critical distance from this ability; we may
> now expect a more conscious use of it. ("On Memory" 399)

Humans are both natural and anti-natural beings. This apparent contradiction arises from

his definition of memory as anti-entropic. Flusser sees similar types of memories in both

human beings and the natural environment, defining them both as processes—not

places—of information storage. Imagining memories found in nature as islands

temporarily forming in a stream of the natural flux of change allows him to define things

like atoms and galaxies as natural memories, and even the entire biomass of Earth as a

process of genetic memory. These memories, in his sense of the term, are "negatively

entropic epicycles that sit upon the linear entropic tendency of nature" ("On Memory"

397). That is to say, things in nature tend to fall apart, and new things are created from

the leftover pieces of old things, and eventually these new things too fall apart, and the

cycle repeats indefinitely. Things, molecules, galaxies and organisms arise for a time,

but in the end everything dies, all heat dissipates, and disorganization will increase until

every bit of matter or energy separates from all others in space and things disintegrate

into non-things. Living organisms, including humans, are themselves memories that

temporarily contradict the entropic tendency toward loss of information and decay

because they preserve structural information in genes to be passed on to future generations.

The second principle of thermodynamics that states that the entropy or uniformity of a closed system always increases is central to Flusser's understanding of humans' relationship to nature. In his definition, the law simply "states that information contained in nature tends to be forgotten" ("On Memory" 397). Because the fundamental characteristic of nature is its tendency toward entropy, he says, human culture must therefore be seen as an anti-entropic activity, "negentropy:" the attempt to store and pass on information acquired by previous generations to future ones just like the process of genetic inheritance. Culture is the struggle against nature. Humans' cultural memory, the much-debated inheritance of acquired information believed impossible in the rest of nature, is less reliable than genetic memory, however, because the objects used by humans to store the information are themselves subject to entropy (and thus part of nature even when in the form of steel or concrete). Whether airwaves between two speakers or harder materials like paper, wood, metal and stone, all are prone to interference from outside noise, understood both in the common auditory sense of the term, as well as in the sense of chaos that disrupts the message in information science. The storage of information in objects is a process of developing increasingly better means to slow or prevent the entropic loss of information in objects, that is to say, it is the process of developing technological media and codes for communication.

Flusser's information theory of human culture takes on dramatic proportions. As one stage in the cultural engagement towards information preservation and communication, the use of the written alphabet Flusser equates with the evolution of a

sense of individuality, self or spirit in human culture. Libraries, existing as a sort of

"transhuman" or "superhuman" memory, Flusser writes, became for us humans a

transcendental realm of eternal forms and knowledge not subject to entropy ("On

Memory" 398). Transcendental in their capacity for information storage far beyond that

of the human mind, and in their existence outside of the human mind, the body of

knowledge contained in libraries, in the mass of printed material, was at the same time

partially contained inside of us; we thus (partially) joined this transcendental realm and

became subjects in an objective world, minds separated from bodies. The advance of

technology to the digital code centuries later, Flusser deduces, allowed for simulations of

these subjective human minds built from inanimate objects (electronic computers).

According to Flusser, as we observe and program these artificial memories, we may

emancipate ourselves from the necessity of storing information in order to focus more on

creatively processing it. Altogether, this will lead us to define memory as a process

instead of a thing, equally functional in silicon chips as in neuronal synapses. This

definition dissolves the conceptual and material boundaries between humans and the

world of objects so that we may consider ourselves part of what could be called a united

world memory. The human 'self,' Flusser continues, as well as all other objects, will

then be seen simply as a knot of relationships between other selves-objects in the

interconnected web of the natural-cultural ecosystem, the process of information

acquisition, storage and transmission that flows through all living and non-living

relational 'knots' in the web of life. Animate and inanimate objects alike are just knots of

relations, physical objects just points of overlap between force fields, and living

organisms "provisional protuberances from the mass of genetic information" ("On

Memory" 399). As the world can be seen to function more like a giant human brain than a group of individuals, humans may be considered interdependent parts of nature's global memory: naturally-occurring organisms pursuing negentropic, anti-natural ends.

Only after an acquaintance with the majority of Flusser's body of work may his reader recognize this conclusion as the foundation of his philosophy of the human-nature relationship. While Flusser believes this natural, anti-natural tendency will remain nevertheless mysterious, an understanding of humans' place in this universal ecosystem is crucial for perceiving the implications of digital technology in society and the environment. Flusser's visualization of the structure of society in the digital age, what he calls the "telematic" universe, can be understood in this sense. Flusser's concept of information flow structures the material world as much as it does interpersonal relationships and even our experience of space-time. Fundamental to this new relational structure is the proliferation of technology that has translated much of the world into the digital realm. The way information flows digitally is radically new, Flusser acknowledges, and has reached the point where it is widespread enough to drastically transform the everyday experience of life for the majority of people on the planet. It is also unimaginably old, at least partially present in prehistoric, even seemingly eternal biological and physical processes. This, at least, is what Flusser's metaphors say. Our world was digital ever since we understood "daß alle Wellen aus Tropfen bestehen," he writes, referring to a Democritean atomism he only explicitly mentions in other essays (*Die Schrift* 132). It is this definition of digital structures in terms of the most primordial building blocks of life on earth which suggests that the digital turn was not just a completely new revolution in thought and action, but also a memory of something

forgotten, something that was always around—something present in nature just as much as in computers. To see the digital future of humanity, Flusser's reader learns, we must take to the microscope: through this metaphor we must see the world, the ocean of life, as so many tiny droplets, not just a smooth empty space through which fish swim, through which we travel on our course through time and space. Living in the telematic age will build on this understanding and consist of rearranging the ocean's droplets to build our own waves, and our own fish.

Humans' natural and anti-natural existence and the metaphors that illustrate this can be further understood through a closer examination of the structure of the atomic or synaptic circulation of information. The universe according to Flusser looks something like a mass of cobwebs, a neural network or an ocean of floating plankton, where the borders—conceptual as well as material—between the natural world and objects of human construction have completely dissolved. People and their environment have changed each other in a symbiotic process that has completely transformed the relationships between people as well as their collective relationship with nature. Indeed, Flusser goes so far as to define a living organism as no less than a combination of both organism and environment (*Vampyroteuthis* 33).

Human, Abstracted

Writing on this topic mainly in the 1970s and 1980s, Flusser saw already in the configuration of humans, technology and the biosphere surrounding him the beginnings of his telematic society. By means of a technological revolution currently underway, he believed the immediate future would be characterized by its network structure of information flow. It must be remembered, however, that Flusser was writing before the

internet played any kind of significant role in society. He merely envisioned in abstract

terms a means of communication that would take place in the form of an interpersonal

dialogue in multiple directions simultaneously, woven into a fabric of interconnected

relations that intersect at the knots, or nodes, which are both human and artificial subjects

(brains and computers). In reaction to Habermas and the importance the Frankfurt school

placed on the autonomous subject, Flusser's telematic subject exists only as the

insubstantial intersection of multiple threads of communication or fields of relations, an

onion with layers of identities ("masks") that form only in relationships with other nodes,

possessing no concrete "self" at its core (Gochenour 321).

> [Human subjects] are hollow like onions.… An image of humanity of this type is
> obvious not only thanks to psychoanalysis and existential analysis but
> corresponds also to the concepts of other areas, for example, ecology (organisms
> are knottings together of ecosystems); molecular biology (phenotypes are
> knottings together of genetic information); or atomic physics (bodies are the
> knottings together of the four field strengths). ("The City" 325)

Human beings must be seen, he believes, as dependent upon their connections with other

living and nonliving entities for their essence, possessing no substance unique to

themselves outside of the communicational network. Only the relations are concrete.

Individuals and objects are only immaterial nodes, therefore, and the world can be

viewed as a conglomeration of equal parts, a mosaic of particles of matter, energy or

information of equal size. Divisions between bodies and independent conscious minds

disappear in this new way of being-in-the-world, a term Flusser uses many times without

explicitly citing Heidegger, a way of being that owes its transformation to the increasing

dominance of digital technology in the sphere of human communication. The reason is

that with the digital revolution, Flusser explains, information can now be separated from

the objects that once embodied it—from tools, utensils, buildings, books, artworks and

other cultural artifacts. The informing of cultural products was always a struggle against nature, he believes, and specifically against the natural tendency of things to disorganize, to lose their information. Continuously returning to the second law of thermodynamics, Flusser explains that humans encode information into objects in order to preserve it as long as possible from entropy, that movement of all nature toward dissolution and decay and of all memories toward oblivion. As Flusser sees it, information in digital form can be circulated throughout the intersubjective network without having to be stored in intermediary objects that decompose over time. It travels from one memory to the next, where it is stored, processed, manipulated and passed on again directly to others. These may be human or natural memories, but they may also be artificial memories like computers, robots and the like.

The circulation of information in the webs of the relational network is continuous, Flusser emphasizes, so that it is only temporarily stored in individual memories, to eventually be altered in some way through creative manipulation in order to then be retransmitted to others. Flusser's communication structure produces a relational intersubjectivity where individuals address each other—indeed, cooperatively constitute each other—in a secularization of Martin Buber's dialogue.[3] Where Buber's *Ich* becomes an *Ich* in the direct address of a *Du*, Flusser's "self," "node" or "organism" exists only in its relationship to other selves (including other objects) in its environment. The interpersonal dialogue of collaborative creative play Flusser envisions consists of synthesizing and re-synthesizing bits of information to be remembered and retransmitted.

---

3 Martin Buber's *Ich und Du* (1919). Stuttgart: Reclam, 2008. A copy of Buber's text exists in Flusser's travel library at the Flusser Archiv Berlin.

This continuous process is exactly that struggle against entropy; it is combining remnants of old information into new informative constructions aimed at other selves to protect against the abyss of oblivion and disinformation. This abyss is exactly what drives the purposeful creation of meaning in the face of a world acknowledged as *bodenlos*. Remarkably, it is only as natural parts of an interconnected whole ecosystem that humans' negentropic, anti-natural engagement can take form.

The world became *bodenlos* after humans removed themselves from nature in an attempt to deny the naturalness of death, oblivion and absurdity. Flusser delineates a process of progressive abstraction as the phenomenon of human culture, the natural tendency of humans to act against nature. Developing technological means to bridge this gap between themselves and nature, humans succeeded only in further removing themselves from their goal, eventually arriving at a digitized relationship to the environment. The culmination of a series of abstractions from nature, Flusser explains the transition to the digital code as the last in a series of successive revolutions in human thought structured by their corresponding codes of communication. Although he will eventually proclaim the end of history for humankind, he orders these revolutions into a temporal progression, resulting in a total of five different stages of human culture which can be found in countless permutations throughout Flusser's oeuvre. Roughly, the first stage of so-called prehistory took place in a mythical realm of human thought where time was cyclical, eternally repeating, circulating through a static space full of values, as in magic. Because forms were fixed ideas, they could be good or evil and possess magical properties just like in orally-transmitted myths. Eventually, handworkers struggled to inform objects by attempting to mold them into these fixed, ideal forms which were the

measure of the object's worth according to its degree of similarity to the unattainable forms. This struggle marked what Flusser describes as the separation of humans as subjects from the objects of their actions. In this way humans' four-dimensional bodily experience of and interaction with nature was reduced to a three-dimensional code with the development of stone tools which in time led to concern for sculpture and handicrafts. The world was thus something to manipulate on a scale of three dimensions so that the information would seem to persist in the stone much after the sculptor's death, resisting the entropy obvious in four-dimensional nature and storing the information for transmission to all observers regardless of the absented dimension of time (although stone does imperceptibly decay). Now there were sculptor and observer and the birth of subjectivity, and the beginning of an abstraction from the natural world.

Later with the emergence of cave-painting, Flusser's history continues, humans created a two-dimensional image code that allowed them to "imagine" the world, to step back further from the world of immediate experience and retreat further into the self, into subjectivity. Images, like sculptures, were copies of facts about the world, maps to help humans orient themselves in the world, models for future behavior: like a symbolic representation drawn by a scout to a group of hunters on a cave wall of the location of a herd of animals targeted for an upcoming hunting expedition. This reduction of dimensions in their communicational codes meant humans became further and further removed from an immediate experience of the world. The paradigm shift experienced here can be explained by the structure of the code, Flusser explains: The relations between parts of the image are reciprocal, reversible; they can be viewed repeatedly, scanned back and forth by the eye from different directions, and therefore humans began

to imagine the world as also formed of reciprocal, reversible relations between objects and subjects. The image in this traditional sense was a result of a second degree of abstraction from nature, the third of the five stages in humans' relationship to nature.

According to Flusser, the next major revolution in human thought occurred with the invention of the written alphabet. Only with the further abstraction to a one-dimensional row of alphabet letters lined up in front of the other in a single direction, Flusser believes, did humans begin to form a concept of history as we now know it. In this historical age, time became linear in human consciousness, and thought in general could be considered linear with the conception of historical progression and causality. In historical time, actions and events caused reactions and other events which caused others in turn—giving human beings a feeling of freedom in the ability to alter the irreversible course of history, to engage in world changes, to act from within the linear progression of time to cause an effect on the future. The culmination of this age of thought was the period of the Enlightenment with its peaks in the development of science, philosophy, religion and politics, as well as history. All these disciplines depend on the thinker's ability to conceptualize or theorize about the world, ordering it in terms of causality and human responsibility.

Although it removed humans yet another degree away from a direct experience of the immanent world, writing was not created to alienate, but to help humans explain the images that had become insufficient as models for human behavior. Eventually images became too hard to read, Flusser explains—they ceased to function as useful representations, instead turning into simulacra or idols to be worshiped, or becoming merely connotative instead of denotative. Replacing the image code with the alphabet

code in the bulk of human communication, that is, rolling out images into one-dimensional lines, as Flusser describes it, turned images into concepts. Humans were permitted to conceptualize the world in further efforts to understand and use it.

Images themselves were still present during the fourth age of history—as all ages are not fully abolished but remain in some form simultaneously with all subsequent ones—but images were now reduced to illustrating texts—even stained-glass windows in churches, for example—which fought against texts but ended up subordinate to them. Culminating in the Enlightenment, so Flusser, theory as science separated itself from and dominated art. Modern historical science was an active modeling of the natural world, an attempt to describe it with the most parsimonious models—for example, Newton's laws of physics, Einstein's relativity, or quantum mechanics. Newer models replaced older ones; 'truer' ones replaced the falsified. Forms, ideas were no longer fixed, they were changeable.

Now Flusser sees humanity again in the midst of experiencing a crisis of faith in the ability of logical, analytical science to give absolute meaning to the world. Linear, irreversible history becomes only one way of ordering experience and now might also be broken up and rearranged with new codes and new technologies. We will approach the end of time and history, Flusser believes, with the entropic advance toward an even distribution of particles, a process that can even now be simulated on a computer screen ("On the End" 146). As the existing dominant code of communication again grows insufficient, a new code becomes necessary to satisfy humans' requirements for successful communication. Texts have grown more difficult to read, Flusser observes, even to the point of becoming meaningless and opaque; their validity is doubted as we

are beginning to realize that the laws we discover in nature and scientifically prove are only what we have ourselves invented. In our age of doubt, approaching the post-historical because post-linear, the dichotomy between science and art dissolves into the distinction between formulation and projection—we simply formulate (discover) theories about the world that we have actually already projected onto the world before our discoveries. All of a sudden, Flusser notes, the true/false opposition shifts to the difference simply between probable and improbable. The ground of linear rationality has given way and *Bodenlosigkeit* is revealed underneath what stood for trusted, grounded reality.

The invention of what he calls a zero-dimensional digital code, Flusser argues, then took place as part of an attempt to explain the texts that had become opaque, to recover meaning in an age of scientific doubt and a growing awareness of absurdity, a new way of orienting humans in the world. Theoretically, information broken up into points has lost all dimensions, he explains, because points really do not exist except in relation to other points. Information, in Flusser's view, is practically immaterial in digital form, and will thus be able to bypass material media completely, a view that will be described in more detail later in this study. Suffice it to say for the moment that this fifth and current age brings about an entirely new way of thinking, communicating and structuring society. Eventually, Flusser believes, it will inaugurate an age when the process of abstraction from the natural world may be reversed—because dimensions cannot be reduced beyond zero. This will involve the computation of digital bits of information to create experiences for humans in one, two, three and perhaps someday even four dimensions. Flusser admits only that although present technologies can easily

create new phenomena like hypertexts and digital images, holography technology and others have yet to be developed sufficiently. The process of reversing the five-steps of abstraction from nature is unfinished but already underway, he claims, and is aimed at returning to human life an experience of meaningfulness. This is not a simple return to four-dimensional nature, however, but rather the formation of an entirely new cultural environment in the form of a second nature. Working with the relational patterns of information flow of the old nature, Flusser envisions how humans' natural and anti-natural electronic endeavors seamlessly join to create a completely new world or worlds out of old bits and pieces and high-tech energy redirection. Understanding exactly how this should come about is the ultimate goal of this study.

Projected Discoveries

Flusser's theory of a second nature goes beyond Marxist categories and is neither identical to Lukács' concept of a "second nature" (which refers to humans' culturally produced surroundings that have become alienated from them and simply mask their unnaturalness), nor to that of the "new nature" posited by Susan Buck-Morss to be found in Benjamin, that synthesis of technology and the technologically-altered material world which has become completely foreign to humans (Buck-Morss 70). Flusser does believe culture has already completely taken over the old nature to become what he also calls a second nature for us, an environment that surrounds us, conditions and limits us in similar ways that the unaltered physical world once did, but this second nature can and should be acknowledged with deliberate intention to manipulate it. The awareness of its constructed form opens up the potential for creative adjustment and poetic license. Once

the fusing of the natural and cultural spheres is acknowledged, meaning can be created where none could be found.

Instead of striving to retrieve a long-lost nature like the Romantics did, for example, an awareness of Flusser's second nature requires simply that the "illusion" of ground or reality must be recognized as a human creation. That is to say, what we experience now as nature must be acknowledged to be projections of our culture instead. After this awareness, Flusser believes the real hope for humanity is opened up: the freedom to purposefully construct multiple realities and multiple meanings for life. This new purpose to human culture will make the communication of information more aware and potentially freer from ideology and oppression, Flusser hopes. The communication of information, the substance of culture and thus what separates humans from animals, he believes, must first be recognized as the human denial of death, and therefore of nature—culture is first and foremost against nature, it is artificial. Flusser bases his whole philosophy of human culture on this definition of communication:

> Dieses Wissen um den Tod (soweit 'Wissen' hier das richtige Wort ist) ist ja schon das Spezifische, eben Gegennatürliche, negativ Entropische am Menschen, denn es zwingt ihn dazu, 'politisch' zu werden, das heißt zu kommunizieren. Die menschliche Kommunikation ist symbolisch, unnatürlich, widernatürlich, weil der Mensch um seinen 'natürlichen' Tod weiß und versucht, ihn symbolisch, unnatürlich zu leugnen. (*Kommunikologie* 260)

Human communication is in this way a natural phenomenon with anti-natural, negentropic tendencies. If one aims at a complete definition of the concept of human culture used in Flusser's writing, however, this criterion alone is not enough to separate humans from the rest of the natural world, because negentropic epicycles within the greater entropic progression make up the rest of the physical environment as well. Flusser illustrates the random (non-human) creation of information in nature with the

26

example of Maxwell's demon, the famous thought experiment by the physicist James Clerk Maxwell in the nineteenth century that poses a hypothetical mediator between two lukewarm air compartments in a box, decreasing the entropy in the box as a whole by only allowing the randomly-moving hot (fast-moving) air particles into the left side and the cold (slow-moving) air particles into the right side, thereby creating a less probable situation: creating information. This negentropic process, while misappropriated somewhat by Flusser, is in his view still natural because it relies partially on statistically necessary chance, just like biological processes, and in fact its impossibility reaffirms in the end the original principle of entropy. The difference is that human communication continues to increase its stores of information, while natural memories cyclically lose, rebuild, and again lose their information. Even more important, though, the communication of information is a human one because it also involves intention. It is purposeful, and therefore valuable, because it may oppose the blind, "stupid" randomness of nature (*Kommunikologie* 252). Therefore Flusser's study of communication, his *Kommunikologie*, is an examination of a wholly artificial phenomenon: communication is artificial because it is both negentropic and intentional, and recognized as such it can be tailored to our demands.

The result of Flusser's examinations reveals the fact that humans tend to forget that communication is artificial, creating a second nature to replace the first, so to speak, to forget death and strive for the immortal. Human culture based on communication in the form of symbolic gestures, languages, images and other codes weaves an increasingly dense fabric out of art, science, philosophy and religion that surrounds humans and veils the *Bodenlosigkeit* of our loneliness and death and the death of our loved ones, so Flusser

27

(*Kommunikologie* 10). We live in a "codified" time, he explains, in which the numerous

codes that make up human culture function as symbolic games for determining the best

strategies for communication. Culture, in Flusser's description, exists as layers of

superimposed symbolic games arising out of nature, but completely different from

nature's layers of superimposed non-symbolic games (genetic mutation, for example).

"Demnach wäre die Natur jener Ozean der Geräusche, in dem das Archipel der

symbolischen Spiele, die Kultur, schwimmt" (*Kommunikologie* 332). Nature as an ocean

of noise, entropy or non-information, and culture as dense clusters of dirt and sand

particles condensed out of the swirling mass of droplets is a thought-model that Flusser

believes can only really be visualized on a computer screen. Two things are important in

this metaphorical formulation, the first showing that digital technology is required in

order to visualize this structure of humans' cultural sphere, and the second revealing the

connections between cultural constructions and the natural environment. Culture can

thus be defined in Flusser's sense as an intentional condensation of raw materials or

energy that takes the place of randomly condensed natural forms: culture as a second

nature, arising out of nature, simulating and replacing it, yet completely opposed to it.

Only when humans remember that this second nature is their own creation are they truly

free to create new and perhaps even better natures.

One can see here the influence of Nietzsche on Flusser's ideas, a source Flusser

was well acquainted with and even referred to occasionally in his work, which is

uncommon in his practice of brazen non-citation. Of particular interest in this context is

Nietzsche's 1873 essay "Über Wahrheit und Lüge im außermoralischen Sinne,"

regarding the human intellect as a fleeting and pitifully insignificant bubble in the grand

scheme of the universe, closing human experience off from the reality or truth of nature. Through a process of abstraction Nietzsche defines as metaphorical, humans by their very *nature* are removed from concrete experience of the environment already in their sensory perceptions, then also in their formation of concepts. Just as perception translates a nerve stimulus into an image or sound, these images are translated by language into generalized concepts, and human culture can thus be seen as a progression of translations, abstractions or metaphors. Since nature itself is responsible for this tendency in closing itself off as inaccessible to us, humans are therefore still natural beings even though their entire conceptual and perceptual universe is a web they have spun around themselves with self-produced materials. Since Nietzsche asserts that humans have forgotten that their perceptual metaphors are metaphors and not things, they forget that nature can only be subjective for them, experienced only in relation to other relations and to themselves. Science, which took over the construction of the conceptual edifice after language, Nietzsche explains, forgets that it produces those "laws of number" that it "discovers" just like a spider spins its own web. What is considered objective reality really is an imitation of relations, a petrification or coagulation of metaphorical images rising like steam from the imagination: humans forget that they are artistically creating subjects.

> Nur durch das Vergessen jener primitiven Metapherwelt, nur durch das Hart- und Starr-Werden einer ursprünglich in hitziger Flüssigkeit aus dem Urvermögen menschlicher Phantasie hervorströmenden Bildermasse, nur durch den unbesiegbaren Glauben, diese Sonne, dieses Fenster, dieser Tisch sei eine Wahrheit an sich, kurz nur dadurch, dass der Mensch sich als Subjekt und zwar als *künstlerisch schaffendes* Subjekt vergisst, lebt er mit einiger Ruhe, Sicherheit und Consequenz; wenn er einen Augenblick nur aus den Gefängnisswänden dieses Glaubens heraus könnte, so wäre es sofort mit seinem "Selbstbewusstsein" vorbei. (Nietzsche 1)

Thus, if the human intellect at least acknowledges its metaphorical distance, humans may then choose to use intuition to rearrange the conceptual edifice and alter it as freely as if it were simply a toy, so Nietzsche. Not only does the dissolution of individual subjects also find its echo in Flusser's telematic universe, even the image of world-condensation out of steam from the "hitzige Flüssigkeit" of human imagination is remarkably close to the fogs and boiling broths of some of Flusser's most creative metaphors discussed below, even if the context and conclusions are very often not at all the same.[4]

Defining Flusser's concepts of nature and culture reveals the complementary function of his imaginative metaphors together with his logical arguments. After the work of defining, a combined analysis of argument and metaphor is just as important in understanding Flusser's vision of humans' potential for creating new environments and actualizing latent possibilities. His model of human natural/anti-natural world-creation is developed extensively in the metaphor of the soup ladle. In *Dinge und Undinge*, a collection of essays devoted entirely to cultural artifacts like empty champagne bottles, streetlamps and chess boards, Flusser re-imagines human culture emerging from chaos as a ladle dipped into a bubbling soup. In this extended metaphor, the important fact is that soup is being ladled out of soup: culture is created out of the frothing broth of nature by means of nature itself, by human brains. Flusser explains with the usual poetic flair how previous myths of religion and science relied upon a deity to ladle out the soup (create the world) or upon empty ladles to be filled with liquid soup (eternal forms separated from formless matter). In the telematic age, then, the ladle emerges spontaneously from the

---

4 A more substantial treatment of Nietzsche's essay in the context of Flusser's work follows in chapter three of this study.

soup itself, he writes, when the ladle is the human brain and the soup is the swirling, foaming ocean of possibilities. No longer a thick stew of tangible materials, he emphasizes, this is a thin, watery broth made up out of the four fundamental forces in physics that together create all matter and energy: electromagnetism, gravity, strong and weak forces. Because these are both energy and matter, the foaming broth of possibilities cannot be categorized as either *Stoff* or *Geist*. Mind and matter alike condense within the soup. "Betrachtet man die Brühe als Stoff, dann kocht man daraus zum Beispiel überschwere künstliche chemische Elemente, und betrachtet man sie als Geist, dann stellt man daraus künstliche Intelligenzen her, die mindestens ebensogut wie die natürlichen schöpfen" (*Dinge* 136). Referring to the human creative process, Flusser sees both physical objects and artificial intelligences formed from the same building blocks of nature, just like nature, but with human intention. Culture using nature to create a second nature entails a recycling of matter and energy both natural and anti-natural.

The ladle, the creative and purposeful human brain, is not analyzed by Flusser scientifically, but metaphorically, "wie die Denker des Barock vom Uhrwerk und die Aufklärer von Maschinen sprachen…Das Gehirn ist das Kulturmodell der Gegenwart" (*Dinge* 137). Flusser further describes the ladle-brain cybernetically, in that its input is in the form of droplets of broth: particles approaching either from the environment or from within the body. The output from the brain then is our actions. Inside the brain, Flusser explains, the broth boils: particles jump "quantally" across the gaps between nerve synapses in the processing of data. As the broth begins to calculate, conduct logical operations and make decisions, it also creates other machines to assist the calculations, and "[d]er unbelebte Stoff ist zu einem tüchtigen Schöpflöffel geworden" (*Dinge* 137).

Playing on the double meaning of *schöpfen*, ladling means creating worlds from a

turbulent ocean of droplets: brains spontaneously emerge from the boiling chaos and then

the turbulent droplets inside their synapses eventually create other brains through

decision operations. These new brains are living, non-living and even semi-living

organisms—"wet" artificial brains composed of living neurons connected to

semiconductors and other hardware. These types of creations are discussed in the

following chapters here; the important thing is that humans, naturally-arising creatures,

have just happened to develop the capacity to create other animate and inanimate beings.

Their natural brains interacting with their natural environment randomly (that is,

naturally) developed the technology to use the randomness of nature's laws in purposeful

ways. The brain is a soup ladle.

> Ein Schöpflöffel, der aus Suppe gemacht ist und der die Suppe desto besser
> schöpft, je suppiger er selbst wird (ich gebe zu: ein etwas schiefes Gleichnis).
> Und dabei entsteht eine seltsame Sache: Das zufällig emporgetauchte Gehirn mit
> seiner zufälligen Fähigkeit, sein eigenes Emportauchen einzusehen, beginnt
> absichtlich zu löffeln…bis schließlich das Schöpfen darin besteht, absichtlich den
> Zufall in Absicht umzustülpen. (*Dinge* 139)

Human creativity is thus to use nature's laws against herself, employing random natural

processes for purposeful ends, even when the purpose is creative play or a curious

experimentation with possible outcomes. Playing chance against chance is for Flusser

the essential defining characteristic of the immaterial information culture.

Using the physical laws of nature to work against nature results in human culture.

Culture can nevertheless appear to be nature, as Flusser carefully demonstrates in his

contemplation of gardens as *Dinge*. Remembering it as one of the earliest examples of

humans manipulating nature, Flusser defines the garden as the attempt to re-form nature

into an ideal environment for humans. Seen historically, he muses, gardens realize the

values and goals of culture, first categorizing valueless nature into useful and poisonous things, later selecting and judging living organisms according to aesthetic criteria. Both practices turn nature into culture, into anti-nature. Now, though, gardens have evolved to possess a deceitful function in human culture, Flusser cautions, representing the attempt to free humans from the cultural apparatus in which they are only "functionaries" and wrongly lead them back to a now-forgotten original nature. From nature to anti-nature, and from culture to anti-culture, gardens are now a second nature and a "bewußt verlogener Versuch" to codify our present environment through cultural conventions into a nature in which we might escape the machinations of mass culture (*Dinge* 48). Gardens are deceptive according to Flusser because they only serve the cultural apparatus while appearing to provide an escape: they refresh the exhausted functionaries so that they may continue to function. Humans rape natural plants to produce cultural ones, in Flusser's view, the naturalness of plants being three-fold: their structure is not made by humans, they are not the result of processes initiated by humans, and they were already in existence before the first humans, the "hypothetische Urmenschen" (*Dinge* 49). Defining nature as simply anti-human, although humans are themselves natural beings, reveals the nature of our second nature—it is very far removed from nature indeed.

Concrete Fog

Parallel to his contemplation of cultural objects, Flusser reflects on natural objects in a collection of essays entitled *Vogelflüge*, written separately as articles for Brazilian, American, French and German newspapers, describing them as explorations of concrete experiences that were rigorously tested by his cultural prejudices. He believes the results of his attempts to negate natural objects by their cultural opposites were in the end

inconclusive, as they showed themselves to be neither wholly natural objects nor purely cultural phenomena. Describing his essayistic writing style as exploratory, the end goal is for Flusser not nearly as important as the process of discovery, and what came out of these thought experiments was the invalidity of the nature/culture distinction itself. While culture alienates human beings from nature in order to free them from nature's physical constraints, it takes the place of nature, conditioning and limiting humans in exactly the same way that nature once did: "Ich versuche, die Kultur nicht als etwas Erzeugtes, sondern als das Gegebene, folglich als Natur darzustellen" (*Vogelflüge* 120). Culture as a second nature is thus not a simple dialectical opposition, as much as Flusser admits wanting to find one, but rather a dissolving of the boundary between culture and nature to the point where the word "nature" has become meaningless.

This is revealed in *Vogelflüge*, the German version of the Portuguese *Natural.mente*. Flusser himself looked back upon his writing to exclaim how his linear arguments veered toward the chaotic, the closer the philosopher was able to approach a concrete experience of his environment. Although linear, scientific reasoning is a necessary step toward understanding our surroundings, for Flusser it only serves to remove the veil of ideology that distances us from concrete experience, after which intuition must take over. Defining both the "reality" of nature and the constructs of culture as a type of fog, Flusser means to emphasize the opacity inherent to both. Removing the cultural fog of religion, myth and other ideologies does not reveal a fundamental reality, that is, but rather it reveals the "concrete" fog, the natural phenomenon made of tiny water droplets suspended in the air. This natural fog is just as mysterious and ungraspable, Flusser determines, as the idea of some underlying reality

obscured by natural objects or our perceptions of them. In using careful reason to dispel

ideology that explains nature, what must be revealed by scientific logic is simply this

mystery, the fact that nature or reality cannot be explained at all. For Flusser, the only

way to concretely experience the fog is to absorb it through his pores. Inhaling and

absorbing the natural fog is for him a concrete experience of "religiosity," only possible

after the cultural fog of established religions is burned up in the light of reason (Flusser

references Bloch's claim for a real religiosity only possible after the erasure of

established religion, his *Prinzip Hoffnung*). Reality is dark, but it is not the darkness of

anti-rational obscurantism. Reason must first evaporate the metaphorical fog of

obscurantism in order to allow the mystery of nature into one's pores, in order to immerse

oneself through intuition into the true irrational darkness of nature.

Flusser's contemplation of natural things always comes up against layers of

cultural constructions, the removal of which is a necessary part of the process of

completely and openly observing nature. In the contemplation of a winter landscape, for

example, although Flusser admits that a direct, completely unmediated perception is

impossible (itself a cultural prejudice), he also urges that the layers of cultural

knowledge, assumptions and prejudices must be recognized as our own projections.

Criticizing these layers serves to recognize the "programmed" nature of humans, that we

are historically programmed. In so doing we learn that "die Beobachtung der Natur eine

Kritik der Kulturgeschichte ist" (*Vogelflüge* 101). Inspired by a childhood memory of

baiting worms on a fishing hook, Flusser analyzes three kinds of cultural layers to be

dissected, summarized as follows: Aesthetic layers filter the landscape so that the scene

becomes expressionistic, impressionistic, romantic, classical, hyper-realistic or otherwise.

Ethical layers present models for human behavior upon the scene, one model in which

nature is not as it should be and needs to be changed, another in which it desires our

submission, and yet another model in which it becomes the mere backdrop for the

theatrical stage of our actions. There are explanatory levels as well which also exist

simultaneously, overlapping with one another, even though they appear to historically

follow and falsify each other. Examples of these are explanations of life as a product of

divine creation alongside evolutionary models of the origin of life. Religious and

mythical explanations are more difficult to falsify, Flusser maintains, since they do not

explicate the exact steps involved in the game of creation, but the scientific models break

down the rules of the game, the physical laws of nature, very precisely. The more

detailed the rules are explained, the faster the landscape seems to disappear until only the

game rules remain. Thus, Flusser believes both types of models are necessary: the

religious one in order to see nature as a whole, and the scientific one to understand how it

really works.

> Auf diese total verwirrte, epistemologische, ethische und ästhetische Weise trete
> ich der Natur entgegen und versuche den Abgrund, der uns trennt, zu überholen.
> Ist das nicht wunderbar? Ja, die Natur ist wunderbar: Sie besteht aus
> aufgespießten Regenwürmern, in denen ich den Schöpfer bewundere, der nichts
> als eine Projektion einer verblödeten Dialektik zwischen Zufall und
> Notwendigkeit ist. (*Vogelflüge* 104)

The layers of culture projected onto nature are all that nature is, then, like the proverbial

onion.

After Flusser denudes the cultural onion he starts again from the other side to pick

apart the layers of multiple natures grown into one another beyond the window through

which he views the landscape. All the different ways of looking at the world produce

different views of the same landscape when observed through the window, that is, when

contemplated from the human perspective. We don't live in one nature, Flusser decides,

we live in many natures all at once, and one or the other may rise to the foreground

depending on context. We live in the nature categorized by our natural sciences, in that

of Aristotelian categories of justice and order (everything in its right place), in the nature

full of mythical deities, in the nature created by God (*Vogelflüge* 84). All present

simultaneously, the layers intermesh both outside the window and inside as human

projections paint the environment onto the window of contemplation, and culture is

mixed with nature inseparably.

The traditional anthropology that defines human beings as individual bodies and

minds distinct from others, advancing towards the outside world and retreating back into

the inner self, also implicates the traditional notion of house as a "point of departure

toward adventure and of return toward selfishness," Flusser explains ("About a house" 1).

Walls, roofs, doors and windows negotiate the architectural relationships between public,

private and transcendent spaces—inside, outside and above—and preserve the integrity

of selves. However, once organisms and other physical objects can be divided into

quanta, motions into "actomes," minds into stimuli or "decidemes" and calculations

themselves into algorithms, there are no more indivisible individuals and no more houses,

Flusser reasons. Identity is constituted solely in the relationships to other things,

reminiscent of Buber's philosophy of dialogue: "Under analysis 'I' is shown to be a pole

of a dialogical relation with a 'you', that relation is shown to be reversible, and thus 'I'

and 'you' are shown to be abstract extrapolations from that concrete reversible relation"

("About a house" 2). What are real, Flusser continues, are the intersubjective relations

consisting of information flow, and the new house of the telematic age will be not a

structure, but a function: a tool enabling the reception, storage, processing and transmission of data. Following Flusser's formulations, this house would be more a fold in the force field of intersubjective relations, a "wave-trough" (curve in a line representing oscillations of relations) attracting these intersubjective relations which gravitate in to be condensed, to be packed more tightly together ("The City" 326). This process would be the actualization of intersubjective virtualities taking place not in a geographical location, but in a topological pattern of loosely and densely packed relationships.

The process of actualization Flusser explains to be possible only after humans have alienated themselves from the natural world through the five-step process of codification described above. Stepping back from four dimensions to three, where subjects were distinct from objects, and from three to two, where objects were codified into images, then from two to one in the age of linear writing and finally from one to zero dimensions of information bits, there is no further abstraction possible from zero dimensions. The next step in Flusser's view is then to reverse the process and begin calculating the zero-dimensional bits back into words, into images, even into objects through holography and other technologies yet undeveloped, eventually arriving at some point in the indefinite future at a full experience of four-dimensions. Clearly, this is not a return to oil painting, calligraphy or woodcarving, but rather an advance into a foreseeable future in which worlds really can be created at will by information processing. Flusser bases his argument on the fact that physical objects can now be understood as clusters of densely packed molecules surrounded by similarly-constructed

but more loosely packed air molecules, which allows him to define the concreteness of objects as "a function of packing" particles within fields of relations ("About a house" 3).

> We [our creative technologies] have not yet achieved the same degree of compactness as is achieved by our nervous system. This is why we may still distinguish between a given world and synthetized simulations. But the density ("definition") of our projections is improving, and soon a point will be reached where any distinction between the "given" and the "simulated" will no longer be useful. The alternative projected universes will become just as concrete as is the world we perceive with our senses, or inversely: "nature" will be seen as just one of a number of synthetized universes. ("About a house" 3)

It is clear that for Flusser, the creation of a new nature out of information bits will require the collaboration of the artistic, scientific and philosophical realms of human culture. From abstraction to actualization, this new creative relationship between humans and their second nature will need to be aesthetically and ethically evaluated in addition to its scientific rigor.

Flusser's creative interdisciplinary process of actualizing new natures, because it is based on a fundamental abstraction from an older nature, will congeal islands out of oceans slowly, gradually packing sand and shells tighter and tighter as holography, virtual reality and other technologies develop in sophistication. Digital information storage as a process of liberation from material objects will render data easily erasable while still seemingly eternally retrievable. As synthetic objects lose their materiality in the traditional sense of the word, they can be formed and reformed without the resistance of solid materials. Scientists-artists will ladle out only temporary clumps of energy particles in a progressively thinning soup, Flusser envisions, because the clumps are only intermediate steps in the entropic expansion of the universe on its way towards so-called heat-death: as nature's broth boils up into steam. The form of things will evaporate out into a mist of "undingliche Informationen," into images on computer and television

39

screens, digitally preserved data, film reels, holograms and into what makes software soft (*Dinge* 81). The environment will be coded into bits and bytes and dispersed out into a fog of information. "Die Umwelt wird immer weicher, nebelhafter, gespenstischer, und wer sich in ihr orientieren will, muß von diesem ihrem spektralen Charakter ausgehen" (*Dinge* 82). Experience will become, is becoming more important than possessions, Flusser observes, the environment perceived directly into the skin instead of hitting up against it, the fog of condensation absorbed through the pores to the nerve endings.

Flusser's vision of the telematic world reveals a kind of invisibility that has parallels to the newest thinking of Mark Hansen. As part of the keynote conversation of the 2011 Transmediale festival in Berlin, Hansen described the cultural environment as a surround of "atmospheric media" in which digital devices connect with human bodies at the neurological level and thus share with them a joint subjectivity. As ubiquitous phenomena always "on" and acting partially on their own, Hansen suggests, the devices create a change in the environment outside of human conscious experience, interacting with nerve cells, for example, below the level of awareness. Sensibility is mediated prior to conscious perception by the five senses at both macro and micro levels, affecting the environment before or below the human scale. Specifically contradicting his earlier body-centric theories and advancing from Alfred North Whitehead's non-perceptual sensation as prehensions, Hansen describes an "expanded environmental embodiment" which no longer requires the human body to filter or frame experience. His picture of the connectedness of humans, nature and technology at nonhuman scales is not visible, but perhaps visualizable with computer technology or by means of Flusser's frothing, steaming metaphors of oceans, broth, fog and neural synapses evaporating to an

immaterial or at least ungraspable and invisible swirl of energy and information at the service of our fingertips but not our hands.

In the digital age of immaterial *Undinge*, Flusser explains that the hands of the *homo faber* of the industrial revolution have been replaced by the mere fingertips of the *homo ludens* (*Dinge* 84). As all handiwork is left to robots and other artificial intelligences, he believes, only the fingertips are required of humans to manipulate the buttons on computer keyboards, to write and enjoy programs (*Dinge* 86). Pressing buttons is then the expression of freedom, of decision-making. However, Flusser cautions that the digital play with creating alternative worlds out of data streams is no utopia, although places and distances have become merely topological: there will always be a limited number of buttons at our disposal, and we will only ever be able to choose from the possibilities within a given program (*Dinge* 88). The process of critique uncovering the cultural fog of ideological blindness revealing the fog of direct experience is always required alongside an engagement in the science and the art of soup-ladling.

Only following the detailed explication of the terms and functions of nature and culture in Flusser's body of writing was it then possible to sketch out his telematic universe as the basis for putting into context the complex relationship between digital technology, art and the environment. Examining the synthesis of nature and culture in Flusser's concept of a second nature layered with multiple "natures" and cultural implications revealed his perceived disintegration of selves and objects into a chaotic ocean of possibilities out of which new second natures might be created. Later chapters investigate more deeply what it means to create these alternative worlds from the bottom up, actualizing unimaginable possibilities responsibly and playfully. Tracing Flusser's

concept of re-structuring culture through perceptual, conceptual, linguistic, scientific, artistic and technological levels, it will be shown that his ideal creative process could involve humans' cultural use of the unpredictable emergent properties of nature itself. First, however, a direct examination of Flusser's use of metaphor in his science of communication will prove essential to understanding just what kind of art and science may be possible in the telematic future, and how it is demonstrated in Flusser's own writing. Both an example of Flusser's use of metaphor to paint an image of his theories, and a detailed treatment of human culture's natural connections, the *Vampyroteuthis infernalis* expands on the preceding overview and sets the stage for the conclusions in chapters three and four regarding emergent creation. This most ambitious of Flusser's metaphorical projects models human communication in the telematic age after spineless creatures lurking in the ocean's abyssal darkness. Chapter two answers the question of how that ocean of absurdity separating Flusser from a once meaningful world also promises him a new world of meaning in creative dialogue, modeled after the vampire squid.

II: Squids

The Model of the Vampyroteuthis *as Mirror to the Telematic Human*

It turns out that animals living in oceans communicate like humans, that is, like future humans. That frothing ocean of intersubjective information communication envisioned by Flusser in the digital age is nowhere so completely and strikingly modeled as by a soft-bodied tentacled creature living in the deepest recesses of Earth's blackest seas. Molluscan biology serves both fact and fiction in this most developed of Flusser's metaphors for the telematic condition. First science, then fable, Flusser's text is unique among his works, at once a conflict-ridden metaphorical journey into the dark side of human nature while also a performance of his vision of post-scientific discovery. The only way we can effectively contemplate our own existence, our own culture in its trajectory into the telematic, Flusser believes, is to be tricked into thinking it is something else. By scientifically analyzing a non-human completely foreign to us, in many ways our opposite, Flusser's goal is that we are better able to consider the creature objectively, understanding it from a fresh, unbiased perspective. However, his strategy is complex: the ocean dweller is somehow similar to us as well, and as we read Flusser's report we nevertheless identify with the monster as if we were looking into a mirror. Thus his treatment of the squishy mollusc becomes an exploration of the possibilities for human culture that are not yet fully realized but may soon be. Flusser perceives the need for a system of ethical and aesthetic checks and balances on our culture's technological explosion, the need for a fresh, new perspective as well as the need to overcome scientific objectivity. So science and not-science are presented in the *Vampyroteuthis infernalis* (*VI*) as a lens or mirror through which to discover something about a creature like and

43

unlike us, that is us, and the biology of the squidly body becomes a philosophy of the human mind.

Adopting the creature known to science as the vampire squid set as a metaphor for something darkly innate in the human character, Flusser took advantage of the mystery surrounding the animal at the time of writing, as marine science in the 1980s had barely explored those deepest recesses of the ocean. Filling in the information gaps with other sources such as encyclopedic entries on octopi as well as a good deal of imagination, Flusser took the "quasi-unknown" status of the animal "to embody the concept of a paradoxical absolute 'Otherness' that is not exterior or ulterior, but which emanates from within us, or by his own description: the Devil inside all of us and within our culture" (Novaes 12). Introducing the unpublished Portuguese version of the text, portions of which are significantly different from the published German version, translator Rodrigo Novaes wrote that Flusser's task in writing was to provide hope that humans could overcome "our vampyroteuthian, devilish nature" that Flusser himself witnessed in the "irrational irruption of the masses" during WWII (Novaes 12-13). While Flusser definitely proceeds from this motivation, I believe he also is inspired to highlight a more positive potential in humanity, showing that we must not only overcome our animal nature, but must also embrace the possibilities for new kinds of communication and artistic creation. Understood more clearly from one of his earliest Brazilian works, *A História do Diabo* (1965), Flusser's conception of the devil is based on the linear structure of humans' spatio-temporal universe that allows for language, science and technological progress, that can lead unchecked to inhumane proportions, and that now cracks apart in places where a fragmented, digital structure may now take root. As "a

metaphor for the inexplicable drive towards self-organization," Flusser's devil is "the human drive to assert language and meaning" in an otherwise silent, absurd world (Cardoso 6). To be exorcised as well as encountered, the *Vampyroteuthis* is both the dark underbelly of humanity and the soft promise of genuine intersubjective encounter: a model of our future.

A large part of Flusser's prognostication takes place not in what he writes, but how he writes it. The original German version of the text presented here was developed over much of the 1980s while Flusser was publishing some of his most influential theoretical works on media philosophy. A product of this prolific period, his writing style here is completely different from the customary theoretical arguments of his other book-length works in the sense that Flusser only indirectly presents his thoughts on human culture by letting certain impressions rise to the surface of the text after its scientific jargon and sweeping poetic statements have been more or less digested. That is to say that Flusser presents his own epistemological model by way of example, showing instead of explaining a way to combine science and art in order to understand on a deeper level human experience in the telematic age. For Flusser, science is as absurd as it is rigorous, a myth just as any other aspect of human culture, and the deadliest sin, according to Flusser's "history of the devil," is pride: the critical reflection through human reason of an inherently senseless world. We forget "that it is we who are the authors of the laws of nature"—science is our devil, one that Flusser reveals to be merely the sense of awe not at nature but at the products of our own creation, "a song, a hymn in praise of human will" (*Diabo* 170, 157).[5] Playing on the expectations of readers familiar

5 Translations from the Portuguese are mine unless otherwise noted.

with scientific treatises and creative fiction alike, Flusser's efforts to transcend scientific

objectivity can be criticized as unrigorous by traditional disciplinary standards, or

alternatively praised as "the spark of a new method of philosophical thought" (Moles 20).

As with most of Flusser's writings, it is safe to say that almost all of the

Vampyroteuthis was born long before it emerged from his typewriter ink. Despite the

thousands of permutations of his thoughts on paper, Flusser's main method of

communicating his ideas was always through interpersonal dialogue, something that also

heavily influenced his general writing style as well as his vision of telematic,

vampyroteuthian communication. Conversations with other critically engaged thinkers

through discussion and letter exchange allowed Flusser's monster to take its nuanced

shape. Published with the translation from the Portuguese, portions of Flusser's written

correspondence provide insight into his thought process while composing the treatise. In

a letter to his friend Dora Ferreira da Silva, Flusser hints at the scientific, philosophical,

artistic and "intuitive" origins of his "expedition towards the abyss:"

> I have in this entire journey three 'models': Plato's *Symposium*, with the myth of
> the perfect man as an eight-armed sphere, Bosch, and Kafka's *Metamorphosis*. …
> I read biology, neurophysiology, psychology and the Encyclopedia Britannica. …
> I visit aquariums … I seek to intuit the vertebrate, mammalian and primate
> foundation of my own behaviour, and I seek to read the newspapers as if I were a
> mollusk. ("Correspondence" 142)

Louis Bec, self-proclaimed "zoosystematician," illustrator and collaborator on some of

the ideas for the text, told how the *Vampyroteuthis* was presented to him in a French

translation and discussed over the course of weekly conversations in France, the resulting

text "the cephalopodic concretion of a dialogue" ("Vilém" 10).[6] Reminiscing that

"Vilém Flusser was convinced that the practice of philosophy no longer happened in

---

6 Translations from the French are my own unless otherwise noted.

writing, but in the image," Bec appreciated the richness of the image's "polysemia" in Flusser's colorful descriptions, secretly taking inspiration for the illustrations from Flusser's own character traits ("Vilém" 4, "Postscriptum" 1).   The corresponding drawings by Bec appended to the German publication are as richly detailed, scientifically plausible and wildly imaginative as Flusser's writing. Together, they form an example as well as a depiction of knowledge creation in an interdisciplinary and collaborative spirit.

The experience of reading Flusser's boldest experiment is of utmost significance to his purposes, because the contradictions and confusion it creates for the reader highlight his engagement with a kind of writing he calls the philosophical fable or philosophical fiction, an endeavor that promises to transcend pure rational objectivity toward a fuller understanding of the human situation. Although bold in a time of strict disciplinary divisions, the strategy is traced by Erick Felinto back to 17th-Century Baroque natural history or *physica sacra*, where nature always had a mythical history and correspondences with the human spirit that could be deciphered (1-2). Continued in the Romantic and pre-Romantic *Naturphilosophie* inflected by "a desperate thirst for unity: between religion, science, art and nature," the strategy picks up again later in Walter Benjamin's *Naturgeschichte*, mixing human history and natural history to read modern culture's artifacts as fossils and other signs from the book of nature, so Felinto (2). Likewise, Siegfried Zielinski mentions Flusser in his "anarchaeology" of media technology, comparing Flusser's scientific imagination with 16th-Century works like Giovan Battista della Porta's *Magia naturalis:*

> In his lectures, Flusser often jumped back and forth between the reality of facticity and fecund speculation, or sketched the identity of thought that operates within the strong tension of *curiositas* and *necessitas* (curiosity and necessity) as Porta defined the two most important motivations for the work of the researcher.

> Flusser charismatically embodied this identity. ... For established academe, his thinking, characterized by its mental leaps between the disciplines, is unacceptable even today." (97)

Flusser's *Vampyroteuthis*, still quite obscured from general readership, is very slowly beginning to awaken a new appreciation for its contemplation and fabrication that so exquisitely exemplify Flusser's vision of human knowledge creation.

Following the evolution of the text in a roughly chronological order will bring to light particular strategies employed by Flusser to effect a slow process of discovery in the reader, a sort of trickery that is uncovered by the end. Simply put, an unprepared reader expects upon opening the book some facts about an animal that lives in the sea. A scientific treatise on the vampire squid, a rare species of ocean-dwelling mollusc, is plainly titled with its Latin classification and opens with a basic anatomical description and taxonomical context. A contrast to human proportions is offered in order to impress upon the reader the immense stature and utterly foreign habitat of the creature, and the encyclopedic examination continues for another seventy pages. It begins thus:

> I. *Octopoda*
> A genus represented by over 170 species. (The genus *Homo* is represented by a single species—all others have died out.) A few octopodal species are familiar and are commonly eaten (*Octopus vulgaris*). Others (*Octopus appolyon*) grow to an average size of ten meters and are rightly feared—their powerful pincers, sharp teeth, muscular arms equipped with suction organs and a ravenous expression give them a diabolical appearance. Still other species are practically unknown—they inhabit the oceans' abysses. Their body size exceeds 20 meters, their skull capacity that of our own. Such a species so difficult to classify was recently fished out of the Pacific: *Vampyroteuthis infernalis*. (*VI* 9)[7]

---

7 Unless otherwise noted, all excerpts from the *Vampyroteuthis* quoted here are my own translations from the German original, a portion of which can be found in *Flusser Studies* 9, Nov 2009. flusserstudies.net.

An objective, fact-oriented tone pervades the entire report. However, now and again the facts do not seem to add up, the taxonomy is outdated and some of the description waxes poetic. Only gradually does the reader get a strange feeling that the science may be less than objective and rather exaggerated or even false. Later, maybe halfway through the report, the science has somehow transformed into a make-believe world of invented facts and then finally it becomes a disturbing philosophy of human culture from some kind of biological point of view. Or maybe the whole time it was all of these things at once: truth, lies, social critique and a bit of mystery.

Mythical Evolution

The first third of the report describes in detail the phylogenetic history of the vampire squid referred to only by its Latin name *Vampyroteuthis infernalis*, explaining its precise location on the evolutionary tree along with an organized list of its animal ancestors, the earliest of which are also common to humans. The human path is described along the way in just as much detail, ostensibly as a means of comparison for us to understand this alien life form in relation to ourselves. Indeed, as early as the first two pages the reader is learning just as much about human evolution as about the vampyroteuthian. Squids and humans both evolved, one reads, from a common worm-like ancestor called the eucoelomate whose three layers of cellular tissue correspond to particular ways of interacting with the world, protecting the organism from it, digesting it and acting upon it. This is a physiological structure both humans and vampyroteuthes share, Flusser continues, and the differences between the two species in their protective, digestive and manipulative functions become the basis for cultural considerations much later into the text. How we and the vampyroteuthes differently "ingest" the world and

orient ourselves in it, for instance, provides a biological basis for explaining our processes of perception, communication and thought patterns in later sections of the text. Upon first reading, however, the opening passages seem to be purely objective science taken straight from the encyclopedia, or from first-hand research notes from deep-sea expeditions or laboratory examinations.

Nonetheless, what is really happening in this text is evident to the careful reader already in the first paragraphs, and after a while it is clear that the entire commentary on human culture is always rooted in vampyroteuthian taxonomy, physiology and habitat. Flusser's phenomenological bent persuades him to ground all of his understanding of human behavior on the structure of human and vampyroteuthian bodies and environments. Because the vampyroteuthian body is so different from the human, and its habitat so difficult for the human investigator to experience, the animal is to act as a foil to human behavior, our opposite. "It is not easy to approach him taxonomically. And not just taxonomically. Humans and the vampyroteuthis live separate from one another. We are crushed in the extreme pressure of his abyss and he suffocates on the air we breathe" (*VI* 9). The animal is mysterious and unreachable, that is, until a few specimens are purportedly fished out of the deep Pacific, and the strange monstrous thing becomes after all a living being that shares part of its physical structure and function with humans.

> And yet the vampyroteuthis is no stranger to us. ... The same basic structure informs both our bodies. His metabolism is the same as ours. We are both pawns in the same game of the building blocks of genetic information. And we occupy opposite branches of the same phylogenetic tree. Our common ancestors ruled the primordial beaches of the earth for millions of years and only relatively late in the history of life did our paths diverge—when life "decided" to advance onto solid ground on the one hand, and into the oceans' depths on the other. We both harbor the same deep-level memories and we can therefore recognize in the animal a part of ourselves. (*VI* 9-10)

If our bodies have evolved in opposite directions, this was nevertheless on one and the same tree of life, from some supposed ancestral cell, and thus the vampyroteuthian body is both the same and completely opposite the human, our mirror image. Because it is about the body, the responsibility falls to biology to make sense of the beast. And Flusser's science examines the fearsome monster only to draw conclusions about his unsuspecting human readers.

Our evolutionary paths mirror each other. As the human path toward vertebrates centered on the development of a complex digestive tract, Flusser the scientist writes, the invertebrate vampyroteuthian path toward molluscs relied more on developing the nervous system. Along the way, insects branched off from this latter path, going on to develop highly cerebralized super-organisms like anthills and beehives. This explains how even though the vampyroteuthian soft molluscan body "resembles that of bees even less than ours do...entrenched in his memory is the recollection of segmentation and the tendency toward anthills, a recollection we cannot share" (*VI* 13). This evolutionary path will later decide the animal's social life in contrast to that of the human. However, while Flusser stresses the development of the vampyroteuthis as a genetic drift progressing in the exact opposite direction away from human evolution, the animal's developmental history is also to be seen in parallel to the human, with the same kind of branching patterns diverging off from it in similar ways. Where birds branched off from future mammals, bees diverged from future molluscs. The vampyroteuthis' parallel history in the opposite direction and its characteristics so similar yet completely foreign to the human ones create an animal that just might not exist—not, that is, without human beings.

The vampyroteuthian organism is always like and unlike the human animal, always in relation to the human. Although Flusser declares the purpose of the text to be "to grasp the biological framework of vampyroteuthian existence (*VI* 13)," the philosopher's true target is the human being. Through an exploration of the minutest details of the vampyroteuthis' biology, Flusser is really delving deep into the nature of the human animal:

> In this particular framework a few characteristics of human existence become evident. Others reappear fully transformed. Thus a game can be constructed out of curved mirrors with which we can recognize the framework of our own existence, distorted and from a distance. Such a "reflective" game should allow us to attain an admittedly very distant, yet not "transcendent," view of ourselves. This view is not transcendent because it does not look down on the world of humans from a viewpoint in the clouds—"objectively," for example, like the scientific view—but rather from the perspective of the vampyroteuthis who is indeed here with us on earth; he is a co-being.
> What is thus intended here is not science, but rather a fable. Human vertebrate existence shall be criticized from the perspective of a mollusc. Like most fables, this also appears to be about animals. *De te fabula narrator.* (*VI* 13)

This dive into the reflecting pool thus requires a shift in perspective, from an anthropocentric point of view to a look at humans through the vampyroteuthis' eyes. The middle third of the scientific treatise is thus to be read from the animal's perspective, considering the vampyroteuthis instead of the human to be the most highly evolved species on the evolutionary tree, perceiving all others as merely divergent from it, incomplete or degenerate in comparison.

This very deliberate technique Flusser employs in order to pursue his goal of creating that so-called reflective, yet not transcendent, game of understanding ourselves as humans. Flusser's science is not objective, because human beings could only objectively contemplate being human if they were to first "transcend" themselves, that is, step outside of their humanness. As mammals, for example, humans could more

objectively investigate birds than tigers, he explains, because birds as non-mammals are further removed from humans on the phylogenetic tree. Even more objectively can humans study nonliving things, so that astronomy is a more objective science than psychology, Flusser continues. In his attempt to "rescue objectivity," Flusser decides that the science of very nonhuman things is, however, less interesting and even more disgusting to us (in the case of other life forms) the farther removed from humans the object of contemplation may be. Therefore, to the detriment of pure objectivity, we as humans need nevertheless to respond to a minimal level of humanness in things, revealing hard science to be always at least partially subjective like those so-called softer sciences, humanities and the arts. What results is more a method of going beyond objectivity, rather than strictly rejecting or adhering to it:

> Cephalopods are interesting insofar as we recognize ourselves in them, insofar as they are a part of that same life-current that sweeps us along too. And science as a whole is interesting insofar as it is an attempt to orient ourselves in the world. It is a mammalian function—more precisely, a human function like digestion. Insofar as it is "objective," it becomes inhuman. It becomes not "pure," but rather an insanity. The present challenges us to forsake scientific objectivity on behalf of new research methods, without necessarily having to relinquish our previously-attained "objective" expertise. (*VI* 19)

It is this less-than- or more-than-objective science that studies the body, which in turn reflects the vampyroteuthian visage to us as mirror, a recognition by way of metaphor which begins from science and continues on after science. Tentacles and caecal sacs point the way to human self-realization.

Passion Anatomy

A look into our mirror reflects the vampyroteuthis' soft and strange physique. The physiology of the species *Vampyroteuthis infernalis* has developed analogously to that of humans, Flusser writes, evolving a parallel structure but in the opposite direction

53

from *Homo sapiens*. As the head and foot of the animal merged to result in its status as cephalopod (*Kopffüßer*) with tentacles protruding from the front of the body, Flusser reports, the body's axis twisted ninety degrees and the top of the head moved to the bottom producing an upside-down orientation to ours. With our upright gait, after all, our eyes were opened onto the horizon and our hands freed for work, he reasons. These same sensory organs evolved downwards underwater, and "[t]he cephalopods are our antipodes—elevated intelligent bellies, not elevated brains" (VI 20). As our antipodes, vampyroteuthes make use of body parts analogous to ours which function similarly to their human counterparts while having evolved from completely different parts, by which Flusser means to hint at a threatening, latent irrationality. Their teeth, more dangerous than ours, "are of a different origin than our teeth," and their eyes have also evolved similar functions to human eyes, so that the human and vampyroteuthian eyes can be said to converge from different directions. Other body parts are homologous, evolving from the same phylogenetic characteristics into two divergent paths—their digestive organs serve far different purposes than ours do, including glands that secrete sepia ink, poison to paralyze prey, and others that emit light as well as skin pigmentation and even gels to make the skin translucent (*VI* 21). Flusser's emphasis on the analogical and homological development of the vampyroteuthis supports his treatment of the animal's underwater habitat as a reflecting pool for the study of the more dangerous side of human nature. The uncanny vampyroteuthis is like and unlike the human, its foreignness and familiarity one and the same, even the brain has homologous memory processes and analogous thought processes. Understanding the violent monster as humans' mirror image, Flusser's reader may be shocked to discover where "[o]ur existences converge" (*VI* 26). Thinking

with its belly, brandishing sharper teeth and paralyzing poison, the vampyroteuthis would be a terrifying human. Manipulating its skin coloration, it has communicative powers beyond the human.

According to the treatise, vampyroteuthian perception involves sensory organs convergent with ours in the case of photophores acting as eyes, some of which are located on the tentacles. These organs are strange to us, the reader learns, in that they perceive the same light that they project outward. The endless blackness of the oceans' depths require the animal to emit its own light in order to see objects in its immediate environment, perceiving things as they reflect back to the photophores. The brain controls these organs as well as the chromatophores, which alter the color of the animal's translucent skin according to internal stimuli. This expression of inner physical (and mental, Flusser would insist) states between members of the same species receives a unique interpretation in comparison to human culture: "The skin's coloration is an intraspecific code: Cephalopods "speak" by means of skin coloration. The gelatin-secreting gland allows the sender of the color message to remain "invisible" to the receiver. A method of communication reminiscent of our present media" (*VI* 23). Like others earlier in the text, this flash of interpretation is not continued until much further into the treatise, but simply left dangling for the reader to perhaps contemplate under a moment's pause before absorbing more scientific facts in the "kaleidoscopically" or "rhapsodically" structured text (Bozzi 13). But as the text progresses, the science gives way more and more to flashes of the human condition. The treatment of cephalopodic *Dasein* (Flusser's deliberate misuse of Heidegger) sums up with the conclusion that the animals' spirally-formed body gives them an inherent tendency to

want to uncoil, invigorating them with a violent force and a "bloodthirstiness," and leading them to unwind as they evolved into their present state—the species *Vampyroteuthis infernalis*, mirror to the human.

Mental Geology

The species itself has a mind that thinks analogically to the human, Flusser states deliberately, always still an evolutionary product of random chance, never complete. In that both species are the same in this way, Flusser notes, they nevertheless do not perfect each other, but rather serve only to reflect the imperfections of the other (*VI* 27). Because humans evolved (were "exiled") from the primordial beaches of life's beginnings onto dry land and thus strive to "negate" this exile by standing on two legs and reaching for the sky, while vampyroteuthes evolved oppositely into the oceans and attempt to the negate their exile by striving for multidimensionality, both species are bilateral:

> When we negate something, we do this dialectically—we contradict one side from the standpoint of the other. Because we both negate our biological constraints from opposing sides, we contradict each other. And precisely therein lies our equivalence. We find one another as mirror in what we negate. In this admittedly rather diabolical sense (*diabolein* = jumble) we can recognize each other and perceive ourselves in the other. (*VI* 27-8)

Thus the analogical nature of our human and vampyroteuthian development justifies Flusser in the remaining third of his treatise in diving headlong into a wildly abstract interpretation of the animal's physiology and behavior as a counter-model to understanding human culture from a strangely reversed perspective.

Flusser builds his cultural analysis first on the assumption that the "mind" as it is commonly understood to occur in humans is not unique to humans at all but rather simply a matter of degree of complexity in organisms, where a sufficiently complex organism can be said to have developed a mind regardless of the species to which it belongs. Thus,

parallel to human embryology, the more highly developed an organism, the more

recognizable its mental capacity, even in the case of animals quite different from humans.

Once the possibility of a vampyroteuthian mind has been established, Flusser quickly

takes a psychological approach to the squid based on its biology. He applies the obscure

orgone theory of Wilhelm Reich, who located Freud's unconscious tangibly in the

physical makeup of an organism, suggesting that "organisms are accumulations of

repressed pressures" so that their bodies are composed of "stratified memory built from

superimposed repressions, somewhat like geological formations" or "the tree trunk and

its rings" (*VI* 29).

> The layers superficially enveloping the organism accumulate the external and
> internal influences that the organism has repressed in the course of its life,
> forming an armor. In humans these influences are for the most part cultural.
> They are sublated into the musculature. It is a matter of a muscle cramp, of
> individual deportment, of what is called the "personality." The stiffer the cramp,
> the stronger the personality, and a release of the cramp be it through accident or
> deliberate massage ("individual psychoanalysis"), can lead to release and
> dissolution of the personality. (*VI* 29)

Underneath this armor, however, is an even deeper accumulation of pressures from past

generations that influence the organism's genotype, a kind of genetic memory that is

passed on not only from earlier manifestations of that particular species, but all the way

back from other ancestral species, backwards through the history of evolution to a time at

least as early as the most ancient single-celled organisms. These genetic memories

Flusser equates with a more encompassing version of Jung's collective unconscious,

defining an organism thus as

> the phenotypic manifestation of this genotypic repression, that is, a bomb loaded
> with latent energy in which the sum of the pressures incurred throughout the
> course of life and the whole of evolution are preserved. The organism is balled-
> up life energy which explodes when the cramp which is the organism is

released—Reich calls this explosion "orgasm," and the energy he calls "orgone." (*VI* 30)

Further extrapolating from the Reichian model, Flusser writes that the orgone is then to explode in either of two directions, depending on the species. In the case of molluscs, whose evolution brought the mouth and anus closer together, the energy is released in the direction of coitus, orgasm and love. This libidinous energy of the soft-bodied mollusc is "sacrificially female (*eros*)" in comparison to the orgone of insects, whose armored exoskeleton allowed them to achieve a "warlike…fatally rigid (*thanatos*)" personality/muscle cramp/posture as the mouth and anus grew farther away from each other over the slow course of evolution (*VI* 30). The vampyroteuthis, it follows, as the most highly developed of molluscs, "the being that devours his own anus, the most warlike of all life-forms," is perfectly suited to this model, as its ancestors were ringed worms: "segmentation is inscribed into his collective unconscious" (*VI* 30). Fusion of its buccal and anal segments can be considered the ultimate goal of life on earth, Flusser continues, as the animal both devours itself and sacrifices itself to the sexual partner in mating, opening itself up to death as the ultimate form of love, or of permanent orgasm: "His sexualized mouth and his cerebralized sex lead him to cannibalism and suicide" (*VI* 31). Not only because our genetics do not share the collective memory of segmentation, but above all because we cannot possibly attain death in love, this model cannot be applied to human beings in the slightest, Flusser declares. We cannot achieve such a "loathsome horror," the vampyroteuthis is an "anti-model" for us, a "negative utopia" far beyond us, and only by virtue of its unattainability is it fascinating (*VI* 31). The sexual and violent embrace of death as love is exactly the

opposite of Flusser's definition of humanity, whose entire negentropic culture serves only to deny death.

Alien Earth

Studying the "mental" physiology of the vampyroteuthis is only one perspective gained on the equally mysterious human being. For Flusser, the environmental niche that a species inhabits plays an equally important role in this reflective investigation, especially considering Flusser's definition of "species." All of a sudden, midway through the encyclopedic treatise, Flusser rejects scientific categories and specifically the nature-nurture debate, bringing out his better-known theories on human culture as outlined in the first chapter. Defining "species" as not only the genetic and phenotypic traits of the organism, but also the specific habitat that influences and interacts with the organism, he explains that a species per se does not exist except as an abstraction, and that the organism cannot really be separated from its environment except abstractly. This means that following Flusser's phenomenological approach, the vampyroteuthis' environment must be analyzed in as much depth as the organism's physical and mental characteristics. Readers familiar with just about any of Flusser's other works will immediately recognize the direct application of his theories of the "self" as an abstract concept. Parallel to the inextricable connection between organism and environment is his theory that the "self" cannot exist outside of its relations to other selves, so that subject and object do not exist without the other. When he writes in the treatise that "there is no such thing as 'the' human or 'the' vampyroteuthis," the reader may recognize that the human species is just another word for the self—and that when he writes that only an organism's experience of the world is concrete, and that to separate organism and environment as two distinct

entities is simply a matter of abstraction, the reader knows that he is talking about his
famous network of relations:

> Concretely, the environment is basically that which we experience, and we are
> points where the environment is experienced. It all has to do with a web of
> concrete relations. The things of the environment are nothing more than nodes in
> this web and we ourselves are such nodes. We are bound with these things; they
> exist for us. And the things are bound with us; we exist for them. Both
> environment and organism are abstract extrapolations from the concreteness of the
> relations. The organism reflects the environment, the environment reflects the
> organism, and when the relational field changes, both the environment and the
> organism change as well. (*VI* 33)

And now the entire work's premise of objective science is clearly drawn aside for
theoretical interpretation, even as Flusser continues to explore the underwater habitat of
the vampyroteuthis with an encyclopedic thoroughness. The aim of the text remains the
same, and the organism's environment is scrutinized as thoroughly as its anatomy with
the intent always of shedding light on its antipode, the human.

Flusser emphasizes the differences between humans' terrestrial environment and
the vampyroteuthis' aquatic environment as if they were completely opposite worlds. In
his description of the marine world "we hardly recognize our own planet Earth," so
foreign it becomes to the reader "more fantastic than Mars or Venus" (*VI* 33). Making
Earth unrecognizable to himself and his human readers is exactly the method of
examination found in all Flusser's writings and is meant to reveal things previously
inaccessible to us, imperceptible because we take them for granted, because we only
notice things out of the ordinary and not the ordinary things.

> The keyword for this is "habit." To us, his environment is uninhabitable and
> therefore uncommon, so uncommon that we do not recognize our planet from his
> perspective. The same is valid for him—our environment is uninhabitable,
> uncommon. A conversation with the vampyroteuthis is a plunge into the
> uncommon. And into the uncommon one must indeed plunge, if one even wants
> to see the habitual at all. Habit is a cover, it covers over everything. Only from

the uncommon does the habitual become visible and the attempt to change it becomes possible. (*VI* 36-37)

Although his play on the words *Gewohnheit*, *bewohnbar* and *gewöhnlich* is lost in translation, here Flusser explains relatively clearly the reason behind this fantastical journey into the uncharted marine territories so unlike our own. Like so many of his other texts, Flusser takes a fresh perspective on something quite inconspicuous in the human habitat and looks at it as if through the eyes of a Martian or a Venusian. Once the reader is re-seeing such a common and therefore invisible thing as if it were completely uncommon and strange, then "the attempt to change it becomes possible"—in this case, Flusser's injunction to his readers to change their cultural habitat remains rather abstract at first, the reader only begins to perceive the vampyroteuthis as a vague threat, something still undefined and so utterly foreign as to be uncannily familiar.

Opposite our atmosphere, the treatise continues, the vampyroteuthis' abode is a suffocating darkness in which we could never survive. The animal, however, experiences a different ocean than that which we know. Flusser's science now becomes a poetry of colors and images when he describes the aquatic paradise in as much fantastical detail as he so systematically diagrammed the organism's body cavities and family tree:

> The eternal night of the vampyroteuthis is filled with rays of colors and sounds emitted by living beings. An eternal play of color and sound, a *son et lumière* of extraordinary richness. The ground is covered with red, white, violet stones; there are dunes of blue and yellow sand; glass pearls and remains of molten meteorites glitter in-between. Forests, meadows and fields of color-radiating, plantlike animals sway with fan-shaped tentacles in the current. Amongst them wander giant rainbow-colored snails and overhead whir swarms of silver, red and yellow glowing crabs. A throbbing garden that the vampyroteuthis irradiates of his own volition in order to enjoy the garden's fruits in beauty.
> To refresh our memory, let us turn again from his view to our own. We see a cold black hole filled with teeth and jaws, all under a pressure that crushes everything. Two models of existence for supposedly the same environment collide with one another: paradise and hell. (*VI* 36)

61

As irreconcilable as those two realms of land and water may be, something in Flusser's

depiction confuses the dichotomy. His readers recognize a dream world that mirrors their

waking terrestrial life: dunes, forests, meadows and fields characterize the alien

landscape, and the vampyroteuthis itself even cultivates gardens with light almost like a

human horticulturist, although the plants in the garden really are not plants at all. It is an

insane world nevertheless understood by human beings, and only from the human

perspective does it exist. "Whatever occurs, occurs in the human world, even the

vampyroteuthis. He exists only in relation to me" (*VI* 39). This is how we understand

the abyssal realm of the alien creature, the comparison to our world allows us to make

sense of it; our metaphors serve to make the strange familiar, they bring the completely

foreign world into the normal human one for us to digest and ruminate. Yet the

comparison is also meant to help us escape our point of view by offering the perspective

of the vampyroteuthis.

> The vampyroteuthis that we encounter is not vampyroteuthian existence, but
> rather an object of our eyes and hands. And yet to a certain degree we can
> recognize in this object our own existence. As far as we recognize ourselves and
> thus as far as we also perceive differences, we can reconstruct his existence and
> begin to see with his eyes and grasp with his arms. Indeed, this is thereby a
> metaphorical undertaking—we attempt to pull ourselves out of our world and into
> the vampyroteuthian one—but not a transcendental undertaking—we do not
> attempt to overleap our world, but rather to change over into another world. It is
> thus not about a theory, but rather a fable. It is about changing over out of the
> actual world into a fabled world. (*VI* 39)

Analogous Perception

To jump into the alien world of the vampyroteuthis is to try to perceive the world

through the fabled creature's sensory organs by means of metaphor, to which end Flusser

describes in detail how its perceptual mechanisms differ from the human. Following his

tendency to contrast the human and vampyroteuthian animals as binary opposites, Flusser distinguishes between the human active approach to life and the vampyroteuthis' passive absorption of the world. According to Flusser's fundamental understanding of the world, what an organism perceives is directly influenced by the relationship of the physical body to its environment. For humans, he believes the most decisive factor in the structure of our perceptions is the development of an upright gait which not only left the hands free to manipulate and inform objects and the eyes free to view the horizon and contemplate theory (things out of reach of our hands!) but also influenced the development of language and the experience of space and time.   "It is most likely possible to reduce all estimations, values and measurements—that is, not only all epistemology, but also all ethics and aesthetics—to the coordination of hands with eyes. That is, to the upright gate of the human body" (*VI* 38). This specific structural relationship between the human body and environment should then result in an active experience of the world, basically a process of constantly moving towards objects, towards the future, traversing through the present moment and encountering obstacles along the way which we then resolve with our hands and our eyes.

Parallel to this is Flusser's formulation of the vampyroteuthian experience of its surroundings, its passive absorption of the world contrasted with our active forward motion and object manipulation.   The physical structure of a mouth surrounded by arms which direct the ocean water to flow into the mouth in order to absorb nutrients and prey permits only a more passive kind of perception, even impressionistic: "His tentacles, analogous to our hands, are digestive organs. Our form of grasping is active—we traverse a stationary and established world. His form of grasping is passive, passionate,

63

violent—he ingests a world flowing towards him. We grasp what we encounter, he grasps what encounters him. We have 'problems,' he has 'impressions'" (*VI* 39-40). The vampyroteuthis sucks in particles from its aqueous environment, primarily distinguishing between digestible and indigestible substances. While humans change objects in their environment (and therefore themselves) by manipulating them, vampyroteuthes change objects by ingesting and digesting them. And since the organism and environment are always in feedback with one another, the organism is likewise altered by the impressions it receives and ingests. Its "culture" becomes a "critique of impressions," a "discriminatory-critical injection of the world into the subject's interior," while human culture is a projection of the self out against nature's obstacles (*VI* 40).

While the two models of experience should indeed be read as opposite one another, the parallels between the two species still allow Flusser's audience almost to imagine an entirely different way of living in the world. Analogous extremities that perform contrasting functions give the impression that other forms of experience might also be possible for humans. The molluscan passivity, for example, leads to extreme passion, not activity, with the animal's increased predatory speed. In Flusser's colorful terminology, consequently, a "passionate devil" lies behind the world, as opposed to the "active god" that humans discover when they seek transcendence (*VI* 41). Just as reversed is the vamyproteuthis' higher thought processes, its version of rationality being something dark and repressed in contrast with its waking dreamlike state. This is to be of course the opposite of human waking rationality which represses a darker irrationality:

> It is not waking reason that perceives the vampyroteuthian world, but rather the dream. Our common existence is thereby not radically different. As complex beings equipped with complex brains, we are simultaneously both reasonable as well as dreaming beings, yet the two levels of consciousness are stored backwards

in us—our waking consciousness is the vampyroteuthian unconscious. This is
evident, phenomenally, in his attitude towards life: head down, belly up. His
critique of pure reason is our psychoanalysis. (*VI* 42)

Important is that this upside-down waking dreaming is proof for Flusser that humans and

vampyroteuthes are "not radically different." He references Kant and Freud as if the

molluscan creature were rather erudite, but all in an effort to compare our rational and

irrational sides. We are to remember that both species are in possession of both modes of

consciousness, leaving the human reader with a curiosity as to whether standing on one's

head could bring a dream world up to the surface of waking day.

In fact, it is important to remember that Flusser's phenomenological approach to

the study of humans/vampyroteuthes is necessarily based on the body's physical (and

relational) structure, making the case that the two species' opposite locations on the

phylogenetic tree almost entirely explain their contrasting mentalities and cultures.

While this method is applied to virtually all aspects of the vampyroteuthis, nowhere is it

more striking than in Flusser's treatment of the animal's sexuality. The world is grasped,

in both senses of the word, by the creature's sexual organs, he writes, resulting in a more

complete and simultaneous input of perceived stimuli. Because the gonads are located on

the tentacles along with the eyes, more sensory pathways are involved in processing and

interpreting incoming signals, and therefore all information perceived by the organism

has tactile, visual and sexual dimensions. This means that understanding concepts leads

it directly to orgasm:

The world excites the vampyroteuthis sexually—he grasps it with penis and
clitoris. His grasp leads him to orgasm, which is different from our sexually
neutral and therefore existentially dull concepts. The male has a different grasp of
the world than the female. Therefore for the vampyroteuthis there are masculine
and feminine laws of nature. His dialectic (in which he lives just as much as we
do, since we are both bilateria) has a basically gendered color. Not only

65

"true/false," "good/evil," and "beautiful/ugly," but also "positive/negative," "body/wave," in short, "material/paterial" are sexual contradictions. Therefore he cannot attempt to overcome this contradiction like we do, through cold logic "syllogistically," but rather through coitus. The resolution of contradictions is his orgasm. (*VI* 42)

While Flusser's description does not explain which halves of the aforementioned sexual contradictions correspond to males and females, the gendered understanding of the world is to be read as a way of experiencing the environment that is completely different to that of humans. The reader may struggle to comprehend the vampyroteuthian approach, but that is Flusser's point. The treatise describes a foreign world that we humans can try to enter only with difficulty, but in the process of abandoning the familiar grasp of things we may succeed in encountering the creature's violent dark energy, perhaps within ourselves.

Bioluminescent Cognition

Flusser's method of explaining cultural and immaterial phenomena by way of the physical body takes a rather unpredictable route. He rejects defining mental processes by means of neurobiology alone, rejects reducing the "soul" to specific neurons in the grey matter. Just so does he refuse "the fruitless search" to locate the "seat of the soul" in some mythical pineal gland or other place outside the brain (*VI* 44). In effect, Flusser's belief is that scientific advancements in neurobiology are reductive to the point of absurdity, and his self-described phenomenological approach focuses not on the brain but on the hands. The act of human contemplation Flusser explains as a process in which the reasoning faculties cut apart perceived phenomena so that the clearly-defined "rations" and the "gaps" between them may be observed and manipulated, that is, rationalized. Flusser's metaphor of the knife for human reason is extended further to the fingers after

the "rations" have been dissected. Our fingers, he explains, trace the edges of the dissected appearances, and these outlines are lifted up and separated from the appearances, becoming concepts, "empty shells," which we use as models for experiencing the world. This means that we not only change our conceptions of the world based on what we perceive, but we also trim and prune our perceptions with our reasoning knife to fit them into our pre-existing shell-models. This process of feedback between conceptual models and perception Flusser defines as contemplation. "All in all, human contemplation is a knife-manipulation, and the stone knife of the Paleolithic era, the oldest human instrument, is proof for exactly when we began to contemplate" (*VI* 45).

While the vampyroteuthian method of contemplation is, like all of the animal's relevant functions, a backwards and upside-down image of the human version, its philosophy still rests on its corporeal limbs. The animal's photophores on its arms, Flusser claims, project cones of light onto objects in the environment that are thereby pre-rationalized before the perceptions of the objects' reflected light are received by the eyes. The tentacles then grasp the contours of the perceived objects, but because the arms are also equipped with sexual organs, the vampyroteuthis naturally reasons with sexually charged concepts. When a male or female, for example, then "rationally illuminates" the mating partner in order to touch it, what occurs is "a male grasp of female concepts and a female grasp of male concepts" (*VI* 46). Finally, during mating the concepts are synthesized and only then can they be applied to phenomena as models of experience. "Philosophizing for [the vampyroteuthis] is synonymous with copulating," Flusser summarizes (*VI* 46). The vampyroteuthis would then consider human culture to have lost its entire female dimension due to the continued tradition of the physically larger male

repressing the female and always fearing her uprising, so Flusser. In contrast to the human psyche, the vampyroteuthian unconscious treated by its psychoanalysis is loaded with repressed asexual concepts like pure mathematics and logic.

Chromatophore Communication

This provides the basis for Flusser's treatment of the vampyroteuthis' concept of history: the intersubjective communication of information. Because its culture is created in copulation, Flusser states, information is transmitted directly from one individual to another without the intermediary objects that humans rely on like the memory crutches of books, recordings and sculptures. Referencing some of his most fundamental ideas about humans' art and media as reviewed in the preceding chapter, Flusser first treats the vampyroteuthis' intersubjective history through the creature's hypothetical critique of human culture:

> Humans are bathed in a gas mixture called "air." Most inhabitants of air have organs that can cause this gas to vibrate. In humans these vibrations are codified and they convey intraspecific information, like for us is perhaps the case with chromatophores. Consequently, the human possesses a memory in order to store such conveyed information. Yet its memory seems to be rudimentary in comparison to ours—the human finds itself obligated to grasp at memory-crutches. It channels the largest part of its communicative intentions away from humans and in the direction of inanimate objects that are located on the relatively infertile continents in large numbers. These now informed objects are supposed to serve as memory aids.
> Objectively stated, a strange result of this blunder is that human history, in opposition to an authentic history like our own, is present in exactly these informed objects. Not only we vampyroteuthes, but also a visitor from Mars can reconstruct human history from these objects. Therefore, human history is not actually intersubjective but it is absorbed by the object. A failure. (*VI* 48-49)

In contrast, the information history of the vampyroteuthis is intersubjective, mediated only by the various types of glands on or near its skin controlled directly by the brain. Succinctly, its cultural history of communicated information is "a glandular history, a

history of secretions" (*VI* 49). Its chromatophores transmit a color language, Flusser

reports, codified information about the animal's interior state, primarily aimed at mate

seduction. A second type of gland reportedly makes the animal's skin translucent,

whereby it may camouflage the sender in order to elude predators as well as deceive

other vampyroteuthes with abstract messages. A third type secretes a nonfatal poison to

paralyze prey but also to rigidify incoming information, preserving it for later processing

and transmission. Finally, the diverticulum ejects sepia, forming the ink clouds that do

not merely confuse enemies, but are meant rather to deceive other individuals in the form

of fleeting images, self-portraits and other figures. Flusser's rather amusing description is

designed to portray the "deception" behind vampyroteuthian communication, the attempt

to confuse, seduce and ultimately devour the other, allowing it Flusser's designation as

art in the most general sense of the word. The seduction of beauty, Flusser muses, veils

death ultimately in the cultures of both humans and vampyroteuthes.

Vampyroteuthian glandular communication is an open, circulating system of

information creation, storage and transmission that parallels quite obviously Flusser's

vision of the human telematic society described previously. The squid version of his

intersubjective negentropic communication is visible in his rough summary of the

tenticular-neural pathways linking individual vampyroteuthes:

> [An individual] sends light-cones into the world, seizes particles of information
> from these cones with its tentacles and paralyzes it into data. Arriving at the
> central nervous system, this data is processed, compared with the data already
> stored and then sent on to further vampyroteuthes via intraspecific codes by
> means of glands in order to be stored in their memories. In this way a dialogue
> evolves between vampyroteuthes, thanks to which the sum of available
> information continually increases. (*VI* 51)

Paralleling almost exactly the dialogic pathways of human and artificial brain-to-brain information transmission in the network of relations, vampyroteuthian intersubjectivity is wired as a global nervous system. It is no accident that the animal's brain and its connecting neurons form the structural basis of the intersubjective dialogue of information production; Flusser's comparison of computer networks with the central nervous system can be found throughout his body of work. This is, however, only a small piece in the philosophical-fictive narration that explains the entire concept of human culture by way of the mollusc's soft body. The connection between the squishy squid and the telematic society becomes more and more visible as Flusser turns from sex to procreation and the birth of the baby vampyroteuthes.

Social Embryology

Vampyroteuthian young are conceived and born *en masse*, the report states, hatching out of eggs that have been laid together in clusters and fertilized, then incubated and nourished by both parents. The simultaneous birth of the young in cluster formation is the sole determining factor for the species' social organization, producing an egalitarian order strictly conditioned by biology. Since such a structure benefits the entire group at the expense of individual freedom, the vampyroteuthis has a tendency to rebel against its biological constraints and strive for fraternal competition, and ultimately cannibalism. Its social structure is explained by Flusser as a result of its evolution: tracing back its origins on the phylogenetic tree, he reasons that

> The vampyroteuthis descends from the same animals that evolved into ants, and the tendency toward anthills is inscribed in his collective unconscious. Therefore he feels more threatened by anthills, that is, by totalitarian socialization, than we do and whenever he engages in politics he becomes antisocialist. His liberalism is no utopia, but rather a negation of his biological conditions. (*VI* 57)

According to Flusser, although the mollusc's inborn socialism predisposes the animal to a "love" of its neighbor in mating rituals, monogamy and the care of its brood, the vampyroteuthis "learns to hate" when it overcomes its natural conditions. It can also be said that the vampyroteuthis strives for its opposite pole of anthropic selfish individualism.

The human pole, of course, opposite of inborn communal love, is a biological hierarchy founded on inequalities in birth order, Flusser writes. While most human babies are naturally born months or years apart from their siblings, the inequality that differentiates older from younger siblings is not only biological, but also culturally produced, which means that humans can consider possible utopias where such a hierarchy does not exist. Overcoming our human nature leads to loving the other, our neighbor, and Flusser easily extends his analogies to the Jewish and Christian religions by analyzing this love as the triumph of the "spirit" over nature, over sin, vampyroteuthian spirit being the human equivalent of sin and vice versa.

> Spirit—and with that, freedom—as sin. In this, let us not forget that the vampyroteuthis stands on his head. His hell is our heaven, his heaven our hell. His murderous and suicidal anarchy is a hellish society for us, but for him the unattainable bliss of freedom. Love-ready socialist cooperation and cohabitation are for us an unattainable heavenly utopia, a messianic situation—for the vampyroteuthis, however, a hellish anthill. (*VI* 58)

It must not be forgotten that this oppositely-centered abyss of the vampyroteuthis is not to be taken only figuratively. Not only is its natural habitat a suffocating watery hell for us, but also it literally moves backward, so to speak, as its tentacles are supposed to project out from the top of the head due to its twisted head-foot body morphology. In all ways, the animal's opposite biology determining its very opposite culture—except it is not only opposite from us, but also the same. There is a spirit, Flusser decides, that is both human

71

and vampyroteuthian, a spirit present in both our species. Both heaven and hell we have inside us, we are reminded: although we cannot see both sides at once, when we seek to understand the vampyroteuthis and succeed in recognizing its venom and its love, we see the horrifying reflection of our own human nature.

The terminology employed here is deliberate, playing on centuries-old myths of demonic sea monsters and aphrodisiacal many-armed, many-mouthed symbols of love (Bozzi 2). More specifically, the vampire squid from hell is part of what Rainer Guldin has called Flusser's "diabolical principle" that can be traced back to his earliest texts where "the devil as a manifestation of human aspirations" is contrasted with God as the inexpressible empty abyss (1-2). If the vampyroteuthian anthill is hell, it is because the monster represents to us our own human strivings for building up language and culture, in particular scientific progress, to make sense out of the abyssal watery darkness, to forget death. If God is further identified with the chaos and entropy of nature, so Guldin, the devil persists in the form of "negentropic epicycle[s]" directed against the natural decay of all things (5). Since all information created by humans over the course of their history is negentropic, as Flusser sees it, the temptation to overreach the limits of human control over nature in the name of rational progress turns to sin, and is in vain. The cannibalistic toothed and suckered devil is diabolical in its voracity as well as a force of libidinal energy that "rapes" its conversation partner and loves its neighbor, its biology a blatant metaphor for possible human futures.

Artistic Inheritance

If human history is negentropic, then vampyroteuthian history is too, if also exaggerated and extrapolated unchecked. The two species are similar enough, Flusser

continues, that we can recognize in the vampyroteuthis a historical process similar to ours in the transmission of acquired information from generation to generation by means of memories. Flusser's reasoning explains that while all animals pass on their genetic information to their offspring in gametes which can be considered almost immortal memories because of the relative durability of their information, both humans and vampyroteuthes attempt to store acquired information in the memories of future generations just like that which is inherited. By doing so, deliberate intention is inserted into nature's automated "informing" of offspring, one of the central ideas in Flusser's repertoire. Using conventional codes to transmit the acquired information to others' memories, humans and vampyroteuthes can be said to effectively overcome their own animal nature, so Flusser. Of course, the intermediate "memories" that humans use like books, pictures and even buildings are artificial and do not last as long as the practically immortal gametes; they are subject to the noticeable decay and dis-information of nature's entropy. To become intentionally immortal, that is, to preserve their acquired information after their death, humans thus find themselves in a never-ending search for better and better artificial memories, and this Flusser believes is the central problem of their artistic endeavors.

Flusser explains art: Humans are always struggling against the imperfections of the objects in which to store their acquired information. Their choice of material in which to encode their particular experiences also influences which experiences they perceive in the first place: the writer thinks in words, the painter in colors, and this feedback between artist and media object is a weakness in the pursuit of informational immortality. In struggling against the material of their artworks (artificial memories) like

73

stone, paint, wood, alphabet and musical notes, Flusser explains, humans themselves are changed by the material to become sculptor, painter, carpenter, writer or musician. The obsession with the artistic material of the artificial memories leads to a preoccupation with the artwork itself at the expense of information transmission to other human memories. As the artists' interest is absorbed by the object, he writes, they forget their original purpose of interpersonal communication, and they tend "to make from the objects not media of communication, but instead barriers to communication between humans" (*VI* 61).

Enter the vampyroteuthian strategy: first seduce the mating partner to copulation, then express the newly acquired information to the other as orgasmic release, stimulate the other to orgasm in order for the new information to be incorporated into its memory, and the message is passed on further and becomes part of the species' cultural memory. All this is achieved through the vampyroteuthis' skin art, a color-coded secretion of pigments on the skin which seduces and communicates, deceives, rapes and lies. According to Flusser's poetic science, vampyroteuthian skin art is a hateful beauty that deceives in order to achieve immortality. Predictably, humans should recognize in this critical components of our own communication arts: not only do we find deceptive marketing part of our communication strategies, but we are also presently exploring new territories of intersubjective communication, abandoning the object for a so-called immaterial art, as introduced in the previous chapter. Flusser hints that computers may be involved in this breakthrough but does not elaborate on the new forms of artificial memories: "We have lost trust in material objects as artificial memories and are beginning to create another type of artificial memory and to assemble immaterial and

intersubjective mediations. Admittedly these are not photophores on our skin, but they are indeed electromagnetic. A vampyroteuthian revolution is under way" (*VI* 63).

To explain our vampyroteuthian revolution, Flusser here reiterates his classic history of human technology ubiquitous in practically all his works in one form or another. Since the industrial revolution, he begins, machines took over the job of informing (fighting the resistance of) objects, which was once the job of human craftspeople. Because this work is now spared humans, they are free to concentrate on the programs which instruct the machines, therefore on the information itself and not the objects. Although the question is raised whether this information can in any way be independent of the objects it must be imprinted on, Flusser's point is also that some intermediate objects can be spared in the circulation of information. His definition of intersubjective communication thus focuses on the resistance of other brains to newly created or altered information instead of on the resistance of objects. At least, this is the struggle of the vampyroteuthis.

> Human self-actualization is no longer the struggle against the insidious resistance of inert objects, for this struggle can be left to the machines and apparatuses. Human work becomes superfluous. Human self-actualization from now on is the manipulation of new immaterial information, or what is known as "software processing." In this context, "soft" unquestionably refers to mollusks. (*VI* 64)

Here readers of Flusser's other works will recognize his description of the approaching immaterial, soft or foam-like cultural environment of concrete relationships between human and artificial intelligences as described in the previous chapter. If software is molluscan, the vampyroteuthis is a model of none other than the telematic society Flusser foresees for humanity. While intersubjective, orgasmic, brain-to-brain communication may have a utopian ring to it, this form of supposedly more immediate information

exchange can not only be harmful, but is also already in our midst. Chromatophores become pixels, and skin art becomes screen art in this philosophical fable. Particularly in the form of mass media, new communication technology holds a power that can be used for selfish purposes. No matter how wondrous and desirable this mysterious life of the squid may be painted by Flusser, as in the rest of his texts his underlying pessimism concerning the potential extent of individual freedom always comes through in the end.

> Our interest in objects is beginning to wane; we are prepared to create media through which we rape human brains and force them to store immaterial information. We create chromatophores (television, video and computer monitors transmitting synthetic images) with whose help the senders deceitfully seduce the receivers—a strategy that will doubtless be called "art" (in case one does not decide to give up this concept entirely). (*VI* 64-65)

Benthic Psychology

The real role the vampyroteuthis plays in Flusser's critique of human culture is explained by where the animal may be found. Flusser reports that while a few specimens have been fished out of the South China Sea, others have themselves surfaced out of the depths of the human unconscious. Both in the oceans' abysses and in the repressed depths of the human psyche, the vampyroteuthis lays in wait, compact under the intense pressure of the benthic levels and of conscious rationality. Psychologists, biologists and cultural critics alike, Flusser declares, have access to the monstrous mollusc and will inevitably strike upon it at sufficient depths—regardless from which direction. "Down below, all surface categories seem to want to bleed together and every division of depth-research into distinct disciplines seems to become meaningless" (*VI* 66). The difference is merely a matter of perspective: in accordance with Flusser's definition of existence as the relationship of mutual influences between the organism and its environment, what from our individual perspective appears to be the depths of the South China Sea appears

from underneath the water's surface as the depths of the human psyche. Flusser

challenges us to accept a world where there is no underlying truth to be discovered but

only the depths of an absurd abyss and opposite sides from which to view the

vampyroteuthis. "He will be found at that point where submersion into the depths turns

to surfacing—in the antipodes," the reader is advised (*VI* 67). Not only will a biological

excursion into the monster's watery lair lead to a glimpse of the frightful vampyroteuthis,

but the animal itself can be seen to burst through the psyche's repressed layers at

unexpected moments. "Of course that is meant metaphorically," Flusser writes. "But

underneath the surface, one can only speak in metaphors" (*VI* 67).

This is because the vampyroteuthis, in the end, is a metaphor for something in the

darker repressed side of human nature. Flusser mentions in passing seemingly unrelated

things like Nazism, cybernetics, logic and theology that erupt from under the surface

where they ultimately explode in the thinner atmosphere of waking life. In fact, as

already mentioned, the cancerous explosion of scientific rationality unchecked by what

Flusser would call intuitive understanding is the devil behind the squid and behind the

human, a very real possibility in many aspects of life. For the most part, though,

Flusser's readers are forced to guess, to view our dark side only through the game of

reflective mirrors that Flusser presents to us, full of contradictions and mystery. His text

functions as a cunning attempt to view the Medusa through a labyrinth of distorted

mirrors—for approaching the vampyroteuthis is indeed dangerous, he believes. Attempts

to neutralize this ferocity in human nature Flusser decides are destined to fail, because

one cannot touch the slimy mollusc without contamination, without vampyroteuthizing.

> Accordingly, when theologians elevate the diabolical over the divine, when
> cyberneticists elevate automatic feedback over clear decisions, when logicians

77

elevate the mechanical symbol game over truth tables, when Freudians elevate the repressed over consciousness, that is because the vampyroteuthis for his part attempts to sink us to his depths by the Nazis' deeds or by the thermonuclear apparatus. In attempting to release him from his pressure, we are crushed. (*VI* 68)

This text, then, was undertaken in the spirit of approaching the vampyroteuthis without trying to "annihilate" it and without being "devoured." Flusser offers the possibility of reading the text in an effort to embrace both sides of the human spirit, enlightened and libidinal, rational and intuitive. His purpose then would be to "actualize suppressed potentialities which will free the human from its constraints and in order to seek out the vampyroteuthis as one such suppressed human potentiality" (*VI* 69). The animal is a model for the unrealized possibilities available to humanity that were passed over during the course of our cultural evolution, exhibiting traits that were once possible before we branched off from the "ancestral cell" away from the vampyroteuthis. The biological model of evolution and metabolism is suitable for Flusser's purposes because vampyroteuthes and humans alike are admittedly the stuff of biology, and the model of the ancestral cell suggests to us that some of our unrealized possibilities are incorporated in the vampyroteuthis, therefore lying dormant in humanity as well. Biology is necessary for this reason, as a means for orienting the human in "the darkness of the abyss," Flusser cautions, but in the spirit of embracing the vampyroteuthis completely, biology and objective science as a whole must be used only as a stepping stone that must be superseded by less objective, less traditionally rational methods like myths and fables. If the scientific method protects us from being sucked in by the vampyroteuthis, the fable lets us close enough to touch it.

What biologists, depth-researchers and mythologists speak of when they discuss the vampyroteuthis is a corpse dissected according to the rules of science. For

> this reason, the nets with which the vampyroteuthis must be caught cannot be woven from scientific texts. … In the tales to be spun, the sciences should serve as photophores on the fabulous tentacles grasping for the vampyroteuthis. The fables themselves must not be scientific—even when seen from the opinion that the sciences tell nothing other than fables—but rather they should transcend scientific objectivity. … In order to let the vampyroteuthis surface without being devoured by him, probably some science is first necessary in order to factor it out afterwards. (*VI* 69-70)

To approach the vampyroteuthis with the aim of incorporating both "light" and "dark" sides of humanity into our consciousness, one must then already approach it not only from an enlightened scientific place but from an obscurer subjective place as well. Objectivity must be tempered by fiction and feeling, or the vampyroteuthis will either tear apart the investigator or itself be cut to pieces by the knife of reason.

This is a call for ethics. The point of encountering the vampyroteuthis is to come to terms with humanity's hidden monsters without letting them loose unchecked. Deeply affected by the uncontrolled eruption of humanity's dark side in the form of Nazi science, for example, Flusser demands that a balance be maintained, that the scientific understanding of the world always be subject to ethical evaluation as part of a more fully human experience of the world. Flusser writes just in time, for if the vampyroteuthis is a future possibility for us among others couched in the ancestral cell of biological life, technology will soon permit the realization of these possibilities through genetic manipulation. Flusser casually foresees artificial vampyroteuthes and vampyroteuthis-human hybrids but is first and foremost concerned with the ethical perspective on these genetic fabrications that *could* prioritize automated decision-making over human contemplation. "If in the future a gene-technological revolution should take place that lets all machines and instruments become life-forms and lets humans become living

machines, to what extent is the vampyroteuthis involved in this revolution? A question that understandably remains unanswered by the biology to be factored out" (*VI* 70). So biology must be factored out in the process of the fable, and the vampyroteuthis surfaces through metaphor. It surfaces also from aquaria, from dreams, and from ideology, Flusser tells us, but his tale may prove the particular power of metaphor in its ability to allow one to both observe and embrace the beast without annihilation of either side. It is indeed a case of "mutually reflecting mirrors" (*VI* 71). In the chapters to come, tempering science with metaphor will be explored as both the technical and the ethical foundation of creating alternative worlds more human, or more vampyroteuthian.

III: Spider Webs

The Spontaneous Evolution of Culture from Metaphor Machines

Metaphorically speaking, Flusser's metaphors are more than watery mirrors to alternate universes, they are also nets through which to filter the world for optimal absorption through the pores. The function of his common metaphors of oceans, squids, brains, fog and skin, among others, is complex. As layers upon layers of metaphors are delicately peeled back at different scales, they reveal themselves at the core of his thinking to be the most basic building blocks of human culture. They are absolutely essential for constructing Flusser's theoretical universe, creating and revealing relationships between people, nature and technology. Further investigation of the intricate workings of metaphor in his work leads us to nature, sheds light on our second nature, awakens the intuitive creativity required of us in a free telematic future. Flusser's work shall be used to show how metaphor builds language, and through language builds the theories, literature and science out of which human culture emerges. Through metaphor, information is filtered and strained out of chaos into an interconnected textual scaffolding, into the cultural fabric. Without these linguistic and conceptual filters we humans would be without orientation in the chaos of perceptions, simply lost in the sea of information.

Out of context, information is simply noise. Without a structure into which new information can be added, stored and integrated with old information, new information does nothing to help the artificial or natural organism grow and adapt to its environment. It bewilders and disorients; it increases entropy in the system. So too with the human

organism: the mind or intellect must make sense of the world in order to survive in it. Due to our highly developed cognitive processes, however, the human search for meaning extends beyond the most basic survival instincts. Humans are plagued by the joys of existential doubt, the search for truths larger than ourselves and a dependence on an intact sense of reality. Whether our perceptions can be trusted to accurately reflect reality determines our level of doubt, or as Flusser would have it, the other way around— as our doubt progresses, our sense of reality is weakened (*Vom Zweifel* 9). Already in his early Brazilian period, Flusser examined intellectual doubt as a reaction to the nihilism and *Bodenlosigkeit* experienced in a world perceived to be absurd, a world where mythical and scientific narratives break apart at the seams to expose not eternal truths but simply our own handiwork. In particular, he explains how the current crisis of scientific doubt introduced in the first chapter promotes a feeling of disorientation and requires a new kind of conceptual map, stitched together from remnants of the old. Flusser takes on the task of exploring the ways we construct our own meaning so that new orientations can be created from the bottom up and connected into webs that support and structure our changing reality.

To understand the webs we weave is to understand the role of metaphor in the loom. In definition, a metaphor is a figure of speech that joins two unrelated things in order to suggest a resemblance, originally a transfer or carrying over: an *Über-setzen*. The figural quality of language thus comes into play as a system of translations between images in the loosest sense—images visual and audible, linguistic and non-linguistic. The synthesizing action of metaphor is important to understand in the attempt to abstractly tease apart our realities to single strands. Metaphor in Flusser's philosophy

shall be examined here at the minutest scale of perceptual neurons, past the abstract

conceptual level, through to the familiar scale of human experience and beyond to the

macroscopic scale of whole civilizations. Assisted by a reading of Nietzsche's

metaphorical realities, examining Flusser's theories of linguistic reality creation shall

prove the importance of metaphor for his vision of creativity in the telematic age.

Metaphors will be shown not only to translate perception into concepts, language, and

human culture at large, but to generate possible alternative worlds relying equally on both

art and science. Combining art and science, nature and culture, it will be argued that

Flusser's second nature also allows for the compatibility of machines and metaphors as

tools. In support of this collaboration, the scientific principles of emergence will be

offered as one possible orientation for creating new second natures that directly connects

digital technology and the natural world. Thus, it will ultimately be revealed that

Flusser's metaphors add an element of unpredictability to his prediction of a free creative

future.

Nietzsche's Spider Webs

    Friedrich Nietzsche's "Über Wahrheit und Lüge im außermoralischen Sinne"

must be reconsidered here in support of Flusser's explanation of human reality-building

from the foundation. Rarely cited explicitly in Flusser's writing, Nietzsche was

nevertheless very influential on Flusser's philosophy, and the similarities between

Flusser's language theory and this essay in particular cannot be overlooked. Beginning

with sensory stimuli to individual nerve endings and ending only at humans' grandest

social schemes, Nietzsche breaks open human consciousness to show that it is full of only

metaphors. He writes that language which structures our thoughts does not accurately

reflect an objective reality but is a process of subjective translation between "spheres":

percepts, concepts, words are not truths, but illusions built on metaphor with no necessary

or unequivocal correlation between stimulus and representation:

> Das „Ding an sich" (das würde eben die reine folgenlose Wahrheit sein) ist auch
> dem Sprachbildner ganz unfasslich und ganz und gar nicht erstrebenswerth. Er
> bezeichnet nur die Relationen der Dinge zu den Menschen und nimmt zu deren
> Ausdrucke die kühnsten Metaphern zu Hülfe. Ein Nervenreiz zuerst übertragen in
> ein Bild! Erste Metapher. Das Bild wieder nachgeformt in einen Laut! Zweite
> Metapher. Und jedesmal vollständiges Ueberspringen der Sphäre, mitten hinein in
> eine ganz andere und neue. … Logisch geht es also jedenfalls nicht bei der
> Entstehung der Sprache zu, und das ganze Material worin und womit später der
> Mensch der Wahrheit, der Forscher, der Philosoph arbeitet und baut, stammt,
> wenn nicht aus Wolkenkukuksheim, so doch jedenfalls nicht aus dem Wesen der
> Dinge.[8] (Nietzsche 1)

To function, human beings must forget the incompatibility between the chemical, visual

and linguistic spheres, Nietzsche admits, while at the same time they should not forget

the constructedness of their assumed truths. If Nietzsche is right, there must be as many

truths as there are words, and then some. "Was ist ein Wort? Die Abbildung eines

Nervenreizes in Lauten. Von dem Nervenreiz aber weiterzuschliessen auf eine Ursache

ausser uns, ist bereits das Resultat einer falschen und unberechtigten Anwendung des

Satzes vom Grunde" (Nietzsche 1). Words create realities that are not objective.

Already recoded from neurasthenic stimuli and mental images, words become

concepts in another carrying-over, a generalization, an equation of unequal things: a

"Gleichsetzen des Nicht-Gleichen" (Nietzsche 1). Concepts, that is to say, are general

categories that ignore the differences between uniquely experienced individual objects,

grouping them together according to similarities, presumably in order to use them as

---

8 All outdated spellings have been preserved from the original.

logical tools.   So basic are conceptual categories to the human understanding of the

world that it is totally forgotten by thinking beings that "die Natur keine Formen und

Begriffe, also auch keine Gattungen kennt, sondern nur ein für uns unzugängliches und

undefinirbares X" (Nietzsche 1). This inaccessible and indefinable nebula, nature before

words and thoughts, may be cut apart and categorized by human beings via Flusser's

knife of reason, but the multiplicity of the conceptual filters through which people

understand the world must prove that no one reality fits all or holds always true.

Remembering the lessons from the *Vampyroteuthis*, a Flusserian would also approve of a

species-less nature. For Flusser, the natural world contains all possible realities all at

once, therefore there are always more ways to conceptualize a human being's relation to

the world, and the organism, the environment, and therefore the relations between the two

are also always changing (based substantially on the codes of communication, as chapter

one explained).

  For Nietzsche, truths are constantly changing metaphors and anthropomorphisms,

a gelling of the relationships humans have with things, not of things themselves. The so-

called truths have congealed so densely that people forget they are illusions and not

things. Even logic, or especially logic, is built on metaphor, "das *Residuum einer*

Metapher," a product "der künstlerischen Uebertragung eines Nervenreizes in Bilder"

(Nietzsche 1, italics in original). The solidified illusions, because they have petrified

over the ages, seem real. Because they are illusions, however, they are not grounded

necessarily on steadfast truths in nature, but can be snapped off from the base to let a

different structure develop from the same roots. Unlike a plant that grows of itself

without what we would call deliberate intention, though, much of human world-

construction as Nietzsche understands it does not develop organically close to nature, but instead is chosen brick by brick at will according to particular logics, Flusser's deliberate negentropy. Human conceptual filters are rather built up on top of nature, Nietzsche means to show, shaky but strong, with varying degrees of flexibility. His metaphor for the human conceptual edifice is precise:

> Man darf hier den Menschen wohl bewundern als ein gewaltiges Baugenie, dem auf beweglichen Fundamenten und gleichsam auf fliessendem Wasser das Aufthürmen eines unendlich complicirten Begriffsdomes gelingt; freilich, um auf solchen Fundamenten Halt zu finden, muss es ein Bau, wie aus Spinnefäden sein, so zart, um von der Welle mit fortgetragen, so fest, um nicht von dem Winde auseinander geblasen zu werden. Als Baugenie erhebt sich solcher Massen der Mensch weit über die Biene: diese baut aus Wachs, das sie aus der Natur zusammenholt, er aus dem weit zarteren Stoffe der Begriffe, die er erst aus sich fabriciren muss. (Nietzsche 1)

If humans spin their perceived realities from within themselves, then it is an artistic endeavor, Nietzsche believes, one based not on causality but on an „*ästhetisches Verhalten*" (1, italics in original). What should not be forgotten, he decides, is that the weaving of webs is supreme artistry, the spider's creativity with a practical purpose as well. Indeed, humans need their webs to filter information from the environment to make sense of it in order to survive, prosper, reproduce, Nietzsche remembers. Accepting this metaphor, if this web-weaving happens linguistically, it must mean that the webs can also be torn down and rewoven differently. In any given version, what doesn't get filtered through is simply not perceived, which is necessary because otherwise chaos would overload the senses. Following Nietzsche then, because human webs are made of metaphors or words, we get caught in it ourselves when it fails to orient us in our changing natural and cultural environment. When we forget that it must be reconstructed when it no longer fulfills our needs, it can close in around us and suffocate. To use

Flusser's terms, the networked structure around us which we climb to negentropic heights

of information processing and culture-building is truth only temporary, possible or

contingent.

The conceptual scaffolding familiar in Western culture was constructed by

language and continued by an empirical science that gradually phased out aesthetic

awareness, Nietzsche continues, and thus art is what can tear holes through it.

> Jener Trieb zur Metapherbildung, jener Fundamentaltrieb des Menschen, (…) ist
> dadurch, dass aus seinen verflüchtigten Erzeugnissen, den Begriffen, eine reguläre
> und starre neue Welt als eine Zwingburg für ihn gebaut wird, in Wahrheit nicht
> bezwungen und kaum gebändigt. Er sucht sich ein neues Bereich seines Wirkens
> und ein anderes Flussbette und findet es im Mythus und überhaupt in der Kunst.
> Fortwährend verwirrt er die Rubriken und Zellen der Begriffe dadurch dass er
> neue Uebertragungen, Metaphern, Metonymien hinstellt (…) An sich ist ja der
> wache Mensch nur durch das starre und regelmässige Begriffsgespinnst darüber
> im Klaren, dass er wache, und kommt eben deshalb mitunter in den Glauben, er
> träume, wenn jenes Begriffsgespinnst einmal durch die Kunst zerrissen wird.
> (Nietzsche 2)

In the end it becomes clear that the function of art must not be to replace scientific

reason, but rather to complement it in order to create a balance of rational web

construction and irrational deconstruction. The web, like any spider's, must be

constantly torn down and rebuilt in response to the environment. An artistic awareness is

still lacking, however, because it lies between, underneath or beyond words, outside of

the scientific, linguistic thinking-building process. Nietzsche believes the way back to

the nonverbal images of the uncategorized, not-yet-defined nature would require the

silence of intuition, a breaking apart of grammatical logics and a recombining of bits of

old metaphors. "Von diesen Intuitionen aus führt kein regelmässiger Weg in das Land

der gespenstischen Schemata, der Abstraktionen: für sie ist das Wort nicht gemacht, der

Mensch verstummt, wenn er sie sieht, oder redet in lauter verbotenen Metaphern und

unerhörten Begriffsfügungen…" (Nietzsche 2). This task assigned to art to trawl the depths of nature's pre-linguistic, pre-conceptual ocean of chaos should then lead to new metaphorical structures from the bottom up, shifting the human's information filter into new conceptual categories, creating new realities.

The need for paradigm-shifting art in the world of scientific progress seems so dire because tearing the conceptual nets of reason has for the most part been avoided as a frightening disorientation. Nietzsche's view that this is due to our forgetting that our own worlds are self-made can be compared to Flusser's line of thought on the linguistic webs we weave. Flusser does not go so far as to say that humans' realities are mere illusions, but he does believe that humans create their worlds by means of words, drawing out bits of reality from pre-linguistic chaos and processing it into concepts. Nietzsche's metaphorical process of perception, conceptualization and later forgetting, parallels Flusser's view of human linguistic reality-building as a process of concretization and progressive abstraction. Flusser gives all the power to language to construct the conceptual scaffolding, and all the responsibility for tearing it down to begin anew. Illusion, perhaps not, but for Flusser the crisis of scientific doubt has opened up the usual structures leaving reality exposed to a groundless disorienting space that must be reorganized into nets that still manage to catch us from falling into the maelstrom. Like Nietzsche, Flusser wants to smash the rigid scientific compasses by means of art.

Flusser's Poetic Spiders

The fundamental error that underlies the confusion and upheaval resulting from our crisis of doubt in reality Flusser determines to be first and foremost the belief that human thought can somehow objectively reflect the external world around us ("Da

88

Dúvida" 53). On the contrary, he believes, the structure of our thoughts does not reflect

some external reality but rather forms it by actualizing its latent potentialities. This is

possible because thoughts are made of words. Words are impossible to distinguish from

the concepts they represent, Flusser believes, and the intellect, as he terms it, or humans'

general cognitive capacity, is to be thought of as a field on which words are organized by

rules. Therefore the whole of our thoughts makes up language as we know it. Flusser

goes so far as to claim that the structure of sentences in any language is synonymous with

the relations between things in the perceivable world. According to his formulation,

reality's dormant possibilities are realized in the sentence as the verb gives reality to the

subject and object of the sentence, links them and gives them context and meaning.

Language is, after all, a "field on which the search for meaning is played out" ("Da

Dúvida" 54). [9] Meaning occurs in the games of combination.

　　Language or discourse, chains of thoughts strung together, is for Flusser a reality

only ever partially realized. Total realization of all possibilities remains always

unattainable, he reasons, because subjects of sentences, "names" are always multiplying,

always infinite in number. The naming process is developed extensively in Flusser's

early Brazilian work on language theory: naming describes how reality is created by

language. He explains it as a method where a human speaker focuses in on a

"quivering," nameless particle in the swirling ocean of chaos in the environment,

bringing that noise vibration to the surface, giving it context and meaning to become new

information. This is a two-step process involving what he calls "proper names" and

---

9 All translations in this chapter from the Portuguese are my own.

"derived names." These names, grammatical building blocks of reality, are first born as "proper names." Used much differently from its normal context, the term is to describe words or phrases that are spoken with inflection, with a forceful breath or with gestures, to mean "look, over here!" ("Da Dúvida" 55). They are also to be seen as concepts that are "concrete" because they refer only to themselves, they have no external meaning, no significance outside themselves. Proper names in Flusser's sense are "called" out of the abyss of the inarticulable in an act of poetry, philosophy's nearest access to the roots of reality. Poetic verse in Flusser's sense consists of sentences whose subjects name the inarticulable, whose subjects are proper names. The roots of discourse, of language and of reality, Flusser explains, originate in the inarticulable and each proper name is one realized possibility called out from an infinitely inexhaustible supply of nameable possibilities. In the calling or naming process, the "territory of the intellect is extended," the borders of the thinkable world wrestled back ("Da Dúvida" 56).

Only poetry can bring forth proper names, bring something concrete into existence, but Flusser's definition of poetry is broad, closer to the Greek *poiesis*. Music and some forms of painting are also forms of poetry, if and when they are all material, all vibration or sensory stimulation and not representative or referring to some other thing outside the work itself. "Music is a proclaiming of proper names because it signifies itself, and music is a linguistic activity because its primary material is spoken language divested of external significance" ("Concreto-abstrato" 152). The more poetry points inside itself and the less it refers to something external to it, the more concrete it is in Flusser's broad sense. Concrete poetry in the narrow sense as it was practiced as a movement in Brazil during the 1960s when Flusser was writing his language theory

based on the Portuguese language is indeed an influence on Flusser and one of his focal points; he addresses work of specific concrete poets like Haroldo Campos. Poems by these artists contain the sound and structure of language, but would make no sense in conversation, like Campos' word *homemmoendahomemmoagem*—"man-mill-man-grinding," roughly—a "proper name" marked more by its sonorous "m" vibrations than its communicative potential ("Concreto-abstrato" 152). The work of the concrete poets (in both the broad and narrow sense) is to create the roots of reality, Flussers explains, roots that sprout up from the ground of nothingness, a ground that "shakes under the poet's step" ("Concreto-abstrato" 152). In abandoning the terra firma of abstract concepts and conversation, the poet dives into the mystery that is the "*vir-a-ser*," the chaos of the "going-to-be," in order to bring back new proper names that are poems ("Concreto-abstrato" 149). A poem is itself a proper name.

Proper names, inflected verse still stained by the inarticulable, are in a sense raw and must be further processed, Flusser explains, before they can be integrated into common discourse or conversation. For this second step in the naming process, an *homemmoendahomemmoagem* must be generalized to an abstract concept which refers to some thing or group of things outside itself. While the concrete concept "Haroldo Campos" refers to one thing only, Flusser writes, the abstract concept "concrete poet" is a category that refers to many similar things ("Concreto-abstrato" 147). After the proper name is "called forth" a second time, it loses its force as it is further distilled into what Flusser terms a "derived" name or abstract concept. It is "called" a second time, this time to become conversation; it is integrated into discourse, it becomes classifiable. The intellect, Flusser maintains, that field of progressive doubt that begins with poetry and

ends with conversation, alienates itself in the distilling process from its inarticulable origin. This process of abstraction happens not only with individual words and concepts, but can also be traced over the course of history as a whole. Leaping between scales large and small, Flusser defines civilization in its entirety as a "conversation" that progressively substitutes proper names with derived names or concepts ever more universal and abstract. The "field of significance" of concepts changes from small, precise, and full of meaning to larger, universal but empty of meaning ("Concreto-abstrato" 151). Just as Antiquity experienced the transition from myth to philosophy, and the Middle Ages from faith to science, Flusser sums up, the Modern Age underwent a similar phase of abstraction from classical physics to particle physics: a belief in the concreteness of the senses was abstracted and lost its meaning. The time is thus ripe for concrete poetry to try to open the world again to the concrete, he urges. Instead of a return to some original Adamic language, the concrete world would each time construct a different linguistic structure out of the inarticulable—each time a new Adam. The concrete poets, however, are "only a beginning" ("Concreto-abstrato" 151). The many ways toward the concrete we need only imagine.

The Brazilian concrete poets were also not the first. Flusser describes the sung poems of the ancient Greeks as an example of how the sound and tactility of language brought their world into existence, a sort of biofeedback loop creating nature out of myth. He writes of how nature "sprouted out" of those singing poets, meaning that the so-called laws of nature were created from harmonic vibrations between what was sung and what was perceived. Because nature living and nonliving together "breathes rhythmically," the oral histories and myths of the Greeks vibrated in *simpatia* or harmony with nature,

responding to perceptions and creating perceptions through language ("Do Poder" 167).

This same nature is "killed" by scientific language, alienating it from its speakers. So

long ago Pythagoras tried to formulate these laws of nature into magical numbers, Flusser

explains, and the long road to science was begun. While both are ruled by the same

linguistic laws, science's nature is for Flusser an abstraction of the poets' nature.

Biology's intricately indexed species are not the only true laws of nature, he means to

say, but simply abstractions of the mythical beasts, to state one example. The centaur

was at one time just as real and true as, say, the White-naped Crane (*Grus vipio*) is to the

ornithologist, the crane a universalized "repetition of language" emptied of magic,

Flusser would say, while the centaur throbbed and "pulsed from out of the center of

language" ("Do Poder" 170).

Flusser defends his philosophy from critics like Anatol Rosenfeld, who in 1964

considered Flusser's first book *Língua e Realidade* "masterly," but disagreed with his

fuzzy ontology, insisting on the traditional distinctions "between the centaur, an

imaginary being, the mathematical triangle, an ideal being, and the tree, a real being"

(Krause 13). Flusser insists that Rosenfeld hadn't understood the full meaning of the

term *realização*, of which the English "realize" makes better use. Referring both to

conceptual understanding and the actualization of possibilities, the term reflects the

making-real by the intellect by means of its linguistic process of comprehension. Here

Flusser means to address the "unease caused by the fluidity of reality" by explaining its

changeability as contingent on linguistic context (Krause 14). "What right do I have,"

Flusser retorts,

to insist that a tree is not an imaginary being for ecology—to only recognize the forest as real? What right do I have to affirm the ideality of the triangle, not having plunged into the geometrical layer of conversation? What right do I have to proclaim the centaur an imaginary fact for the Greeks of the 9th Century BC, if not the right assigned to me by my own self-designated superiority? (qtd in Krause 14).

A once fluid reality, a re-constructible net has, both Flusser and Nietzsche would say, ossified to form supposed inalienable truths. This scaffolding of truths is for both philosophers an abstraction from its source, one which orients the linguistic spiders quite well for a time but promises a permanence it cannot guarantee. With the flow of time and a fluid reality, webs are rebuilt and truths are redefined. Once again, Flusser decides, the petrified webs of the Western world slowly crumble as doubt increases, and the resulting disorientation should create space for a return to the source and a new orientation.

Now, when the concreteness of poetry feels again called to reverse the abstraction process, language that centers on the senses in a general tactility will be able to create something new. Especially suitable to the task as Flusser sees it is the Portuguese language in particular, like Guimarães Rosa's tale "As garças" ("The Cranes") that celebrates the "musical power of the Portuguese language" by permitting the reader to "vibrate again like Pan's flute" ("Do Poder" 167). In general, Flusser makes clear that the roots of our linguistic world are too far away to be seen or remembered. His readers are urged to return to the roots of reality through a "radical philosophy," a doubting of doubt itself, which would be to reflect the "profane" reality back on itself and strive for its "sacred" source ("Da Dúvida" 60). As we attempt to approach the sacred inarticulable, he writes, we should hope to experience a renewed sense of awe at its nearness. Every verse is a new reflection of reality, an "original sin" (distantly linked to

94

the vampyroteuthian devil) deviating from the infinite truth, its vibration linking it to the inarticulable ("Da Dúvida" 58). From these same roots we are to create a new kind of language. If we can invent a new grammar, following Flusser's reasoning, we can create a new reality, a new information filter.

One way to smash the pillars of the profane is to conceptually and linguistically break through ossified names and logics instead of waiting for them to slowly crumble—to willfully redefine concepts and realities. Flusser's undated essay "On the Importance of Art for Survival" examines the emptying of meaning in our culture of abstraction from a different perspective, focusing on a single word. "Art" as a term has lost its traditional meaning of making beautiful, good or useful things, he decides, the result of a long process of abstraction in Western society in conjunction with the increased futility and utter absurdity of traditionally meaningful concepts. Our culture is now merely a problem of form, Flusser observes according to his structural awareness, in that our nature and culture have lost their purpose and therefore their meaning. Once mythically, once religiously full of purpose in the human world, the mysteries of the natural world and the goals of industrial progress alike have become emptied of value and devolved to mere aimless games to prevent boredom, Flusser feels. Now that we have lost our belief in the utility of the world, nature becomes essentially absurd, and culture and art as well

> are for us fundamentally absurd enterprises, in the sense of being efforts to render useful and meaningful what is essentially futile. This attitude of ours toward culture and art is entirely different from our forefathers' attitude in that it does not assume culture and art to be important for survival, but important as methods, strategies, games, (or whatever the formalistic term we might choose), to pass the time of surviving. ("On the Importance" 4)

We are no longer able to explain human culture in terms of mechanistic, biological,

psychological or sociological theories, Flusser posits, but must instead "take recourse to

theories like those of games, of information, of cybernetics," because our culture is now

"no longer an ontological or existential, but a formal problem" ("On the Importance" 4).

In this sense, art as a concept has changed from the creation of beautiful things, or of

good or useful things, to one of empty value, because beauty, goodness and utility are

also invalid.

> Our word for 'art' is thus empty, and like our word for nature which we have also
> had to redefine, art must be given a new meaning:
> Now this is a rather unusual gesture: we hold a word in our hand which has
> become "empty", (devoid of meaning), and we look for something to "fill it". The
> gesture is unusual, because we are tempted to believe that everything around us
> already has a name, and therefore that to look for something nameless to call it
> "art" is slightly silly. But of course, this is not so. On the contrary: the moment
> we look around us in search of something nameless, all the names covering our
> world seem to evaporate, and leave a totally nameless soup within which we
> swim, ourselves namelessly, and without any orientation. ... Naming is an activity
> which solidifies, and thus "pro-duces" things out of the soup, but un-naming, or
> dis-naming, is an activity which has no name, as yet. … Why not say: let "art"
> mean that activity by which names are lifted from things so that they may be
> discovered *as* things? ("On the Importance" 8-9)

Flusser sees the term "art" as a kind of empty form through which various meanings flow

with the passage of time, similar to the redefinition of countless other words that occurs

over centuries or decades. This changeability of meaning, though, is a process which

reflects Flusser's new meaning of art in particular. Finding new names for things,

creating new meaning in the face of *Bodenlosigkeit*, could go through a backwards-facing

process from profane conversational language through poetic concretization towards the

sacred, unpronounceable, wordless soup. It is a method of redefinition that first lays bare

an undefined mass of countless potentialities to be realized, the wordless soup identical to

96

the ocean of possibilities or the chaotic nature before it was second nature. In a way, it

also reflects Flusser's own manner of writing about humans and their cultural products as

if seen for the first time. Un-naming would be an archeology of sorts, a search for the

roots of things, for what has been lost or covered up over eras of conceptualization and

abstraction. Anti-progress, it would be a digging, an enquiry into the meaning of

meaning, Flusser writes. It would be "anti-magic, (if by 'magic' we understand the

evocation and provocation of things through names in the possession of the magician)"

("On the Importance" 9).

Stripping away the "names" for things, that is, tearing down the conceptual

webbing spun by generations of thinkers and speakers would be the place of art,

something for which Flusser gives few concrete examples. Once space for new

categories is exposed, however, new webs can be spun through poetry in the broad sense.

From there, the structure zooms out to another level beyond individual words and un-

words, further to the level of the linguistic mind. Language as a whole, or the intellect as

Flusser defines it, consists of interlinked chains of words and concepts, so that if words

are concepts making up thoughts, then each thought is a sentence, and logic is a grammar.

These thought-nets are made of sentences and they give their netted structure then to the

reality they construct, very like the silk webs that spiders weave around themselves from

out of themselves, Flusser writes, the only difference being that the webs are "invisible"

(*Vom Zweifel* 27). The linguistic net catches the world, filters what becomes real from

what remains inexpressible and simply imperceptible. The borders of the net or intellect,

the field of doubt or critique, are proper names that make thinking really an act of

wondering—thinking is being outside a thing, not seeing it, and striving to see it, Flusser

ponders. The action of the intellect is a wondering at the wholly other, and allegories are necessary in order for the intellect to describe these proper names, he insists. Proper names are close to the unpronounceable, and in thinking we celebrate our nearness to it, one explanation legitimizing Flusser's philosophy through metaphorical images, through combining science with myth. Because the intellect will soon be sacrificed, he believes, because it will be replaced by something yet unknown, we need to actively try to become thinking beings again because it will keep us human.

Flusser teases apart the workings of the human intellect in *Vom Zweifel*, treating it as a loom on which individual thought-threads are woven into a net or veil, or as a field over which the thought-net is spread. Flusser describes a thought-net that covers over reality while seeking to uncover it at the same time, a search for reality that concomitantly builds reality out of itself similar to the ancient Greek ballads creating instead of discovering the laws of nature. It is a fabric formed by interlinking chains of thoughts, full of tension, desiring to overcome itself in the search for meaning, constituting reality and the thinking subject. The process of thinking he thus describes as one of self-completion or self-reproduction, a chain of thoughts that lead automatically to new thoughts. This definition suggests an image of a fabric weaving itself, organically sprouting new threads in reaction to the perceived world within and without the thinking subject, energized by the never-satiated search for meaning. Flusser further describes the search for meaning as an aesthetic process in search of form, for he believes that where form is found it leads to meaning. Logic, so Flusser, would be one example of such meaningful form, but not the only one. In an absurd world where meaning has left the

old forms, then, human thinking can restructure its forms to create new meaning and a new orientation.

One manifestation of the intellect is the literary work, a form of participation in the general conversation that makes up the fabric of civilizations. According to Flusser, individual works can be confronted by their readers as either answers or provocations. He explains that to view the work as an answer is to analyze it in the spirit of critique, from an attitude of curiosity. To view it as a provocation, the reader must enter into conversation with it, in the spirit of speculation, from an attitude of sympathy. Flusser's word for this is the Portuguese *simpatia*, or sympathy in the Greek sense: "co-vibration" ("Esperando" 70). Attuning oneself to the vibrations of a work is to match wavelengths not only with the content and form of the work itself, he explains, but also with the "climate" in which the work was produced, with the cultural and linguistic context, on the level of the words and on the level of the work. To tune in to the writer's chords is to open one's mind to the message that is sent to the reader, to open one's mind to the text, to the provocation of a conversation. Flusser's formulation gives a sense of organic life to cultural production, even a sense of naturalness in the conversation between human minds and the cultural environment.

How to Weave a Better Web?

Flusser addresses at length the mechanism by which humans weave together meaningful, orientating realities with words—linguistic grids that map out relevant information—only to waste away inside them as the webs slowly cut off vital circulation from the threatening, inexpressible chaos outside. Like Nietzsche, Flusser believes the first problem of humans' doubt in the absolute truth of their opaque, scientifically

explained environments is that they have forgotten how they themselves created their realities in the first place and that they could therefore purposefully recreate them to better serve their changing needs for information synthesis and transmission. Re-weaving the metaphor webs for a new orientation could be the task for a new art, Flusser believes, which must break through the old webs and dip anew into the wordless turbulent soup of pre-creation. Un-naming objects, art reaches backwards to the place where things are not yet things, but vibrate with a tactile life. Naming things in a different way is then the task of poetry in the broad sense, of artistic creation through metaphor. From there, the intellect spins threads of words into sentences, weaves them into texts, which in turn interweave with other texts and other intellects to form networked cultures. Is this basic human creative act the first step in realizing Flusser's envisioned reversal of abstraction from zero-dimensional points to re-synthesized multidimensional realities? Although Flusser does not mention much in the way of specific web orientations that may replace the old while preserving a sense of humanness, do his metaphors generate possibilities that they do not describe? Is our metaphor-based second nature really built from what comes through our pores? How do we alter our skins to fit better? I would like to submit three possible responses to Flusser's version of culture building in the telematic age by suggesting complementary thought structures that could be applied to productively expand on tendencies in Flusser's work to describe possible orientations and directions for creative world building.

 Hypothesis #1: What Flusser is really calling for can be found in what he specifically leaves out. Because he believes Western culture is by its very foundation linguistically incompatible with that of the East, it is impossible for the occidental

hemisphere to comprehend such foreign cultures, and can therefore not meaningfully interact with their reality structures (*Língua e Realidade* 81). If it were possible to access the other side, however, it might nevertheless produce fertile new combinations of concepts that could complement or restructure archaic Western paradigms. Perhaps exactly this incomprehensibility is required to shake the pillars of established epistemological traditions. Thorsten Botz-Bornstein crosses one bridge by bringing the very foreign concept of *wen* from traditional Chinese culture into the scientific discourse, hybridizing the Chinese concept with principles of biological and cultural evolution for a new perspective on nature, culture and science that could suggest a different orientation fitting to Flusser's provocation. The untranslatable *wen* Botz-Bornstein defines as a kind of pattern or structure, but also as writing, literature, or civilization as a whole. Found in both nature and culture, *wen* is a "pattern of interrelating structures that emerge out of concrete situations and reflexively organize and regulate human life in the world" (Botz-Bornstein 168). Passed down and developed from generation to generation, *wen* can be considered a kind of cultural genetic code transmitted through ideograms. *Wen* is also intrinsically natural, however, discoverable as patterns in beautiful natural forms as well as cultural. "It is neither nature nor culture nor a 'posthuman' creation that replaces nature with culture, but a cultural genetic code as much as a natural one" (Botz-Bornstein 168). The process of culture-building is the process of transforming nature via human minds, lifting up *wen* out of phenomena like bird tracks in the snow, making visible patterns that were previously unrealized. The poets do not invent fictional worlds, Botz-Bornstein explains, but rather transmit *wen*.

Because a *wen*-based culture has necessarily to do with nature, culture remains a dynamic system always open to nature's external flux. In the Chinese alphabet, a written character has its own "genetic force;" language exists as an energy that builds up in it and "buds forth," so that Botz-Bornstein can wonder: "Should we say that through Chinese writing nature appears as a paradise engendering concrete things, and not, as in Western writing, as a factory producing mere metaphors?" (171-2). Although not in direct reference to Nietzche or Flusser, Botz-Bornstein holds a complimentary perspective and ponders whether modern science's version of evolution could have developed otherwise, had it entered the discourse much earlier than it did. It could have "smash[ed] the static, classificatory logic of Western thinking" (Botz-Bornstein 172). Just as Flusser and Nietzsche assert that there are no species in nature, in *wen*-based cultures nature is less a book to be read than a dynamic convergence of forces that generates writing. The distinction lies between reducing nature's genetic code to a machine functioning according to evolutionary principles (and that can be tampered with) and always allowing the text to remain natural. Genetic engineering and transhuman cyborg problematics, while appearing to blur the distinction between nature and culture, in effect confirm the nature vs. human/artificial divide, so Botz-Bornstein. A *wen*-based genetics solves these problems by treating genes as both nature and culture from the start.

Botz-Bornstein goes further to outline a *wen*-based "memetics" transcending Richard Dawkins' concept of "memes" for cultural evolution, describing how the Western world-as-machine metaphor is extended into the cultural sphere to a materialism that describes "humans as 'meme machines' and human culture as a web of memes produced by such machines" (Botz-Bornstein 174). In contrast to Dawkins' concept of

memes, cultural "genes" that replicate over generations through imitation, a *wen*-based memetics does not reduce human culture to calculable mimetic machines but unifies form and content, aesthetics and significance. If molecular biology reduces the spatial qualities of nature, whereby bodies and selves are replaced by genetic codes reminiscent of Flusser's narration of the linear turn, traditional Chinese aesthetics described by Botz-Bornstein centers on the dynamic "living" power inherent in memes and genes not only to encode information but to generate structure and aesthetic value. Literature, *wen*, exists in the "aesthetic surplus" produced when reality is imitated by the poets, he writes. It is not created *ex nihilo*, but evolves from nature itself just like the universe itself has no created origin but only "evolved in the course of a natural process of polarization and diversification" (Botz-Bornstein 178). In Chinese aesthetics, culture evolves not by the replication of ideas through technical inventions that overcome nature, but by a process of humans interacting directly with nature, lifting up patterns, rhythms and melodies of universal significance and aesthetic value (Botz-Bornstein 179). Nature is no metaphorical machine, but a living generative force.

Flusser's declared independence from Western thought structures due to his sense of profound *Bodenlosigkeit* in fact led him to devote some of his early pre-publication years to examining Eastern philosophical traditions. He acknowledged the poverty of outdated Western paradigms that evolved strict divisions between nature and culture, resolving that no manner of thinking can ever adequately orient a human being in a reality always already inaccessible. Turning to methods he hoped would free himself from all thought whatsoever, Flusser for his part examined yogic meditation from the Indian tradition as a means to exercise strength of will over thought, as well as Buddhism

to overcome the initial desire to think at all. Never able to integrate such foreign

perspectives into his linguistic conceptual structures, however, Flusser ultimately gave up

such attempts as simple mental gymnastics "in lächerliche Geschmacklosigkeit gebadet,"

rejecting "das ästhetisch Widerliche" that embarrassed him and brought him no further in

surviving an absurd world (*Bodenlos* 62). Although Flusser ultimately decided to remain

aesthetically within the Western tradition, the understanding of *wen* patterns as both

natural and cultural shows tempting similarities to Flusser's second nature, and the

processes by which such patterns spontaneously emerge out of concrete situations to

organize human life are promising for Flusser's search for alternative world creation and

more extensively treated below.

     Hypothesis #2: In all practicality, the Western culture in which Flusser and most

of his readership live can only be restructured from within. It already contains all the

richness needed to refresh and renew itself, it must only dig back far enough to pick up

the lost threads of other potential cultural nets which were dropped along the way

towards the weaving of progress. Tracing back down the strands of time to before

rational scientific discourse forked from its artistic sister thread, a spider wanting to re-

spin reality might find fresh material in the discard pile. While no backwards journey

through time to the highpoint of the Greeks' *techné* is possible, the attempt to reunite

science and art, in particular literature, could still prove a worthwhile direction in the

search for the new models of experience Flusser seeks in his philosophy. David Porush

argues for the importance of metaphor in both scientific and literary ways of knowing and

describing reality, proposing a stronger collaboration between science and literature in

the form of a broader postmodern discourse he calls Eudoxical discourse. Arguing that

postmodernism's defining battle between mechanism and metaphor is tending now towards a resolution, Porush sketches an outline of that resolution using science to prove that literature is just as important in the new postmodern discourse. He examines quantum mechanics, cybernetics, neurology, cognitive science, chaos theory and irrational mathematics to elucidate the epistemological power of metaphor and its superiority to logic-based models of reality that reduce the human sphere to pure mechanism.

Porush challenges the central metaphor of cybernetics, the study of information control and communication, which equates the human mind with a machine and assumes that all minds, whether of neurons or silicon chips, function mechanically and deterministically, meaning that the mind's future actions can be predicted given sufficient knowledge of the starting conditions. Logically based upon a fiction, Porush states, cybernetics mistakenly equates material physical entropy with informational entropy to define information as an independent, measurable thing transported by a signal. Even from within the science of cybernetics, however, this assumption is being challenged which supports the first tenet of Porush's Eudoxical discourse that "information does not exist sensibly, even when it is quantifiable, apart from the metaphorical assumptions that create its context" ("Eudoxical" 44). There is no information without an observer, that is, information only exists as the "relationship between an input and a receiving device" in a formulation by Porush not dissimilar to Flusser's telematic fields of concrete relations ("Eudoxical" 44). Alternatives Porush mentions include different manifestations of what are called second-order cybernetics, a critique focusing on autopoiesis, or how biology organizes itself in such a way that self-aware structures, intelligences, emerge on their

own. Even more productive in Porush's estimation, though, is literary critique in the form of recent fictional works he names "cybernetic fictions" that both depict and perform the struggle between algorithmic, mechanistic descriptions of human experience and the richer literary discourse of "silence, metaphor, irony, ambiguity, paradox, polysemy, symbolism, and nonsense, as well as dramatizations of deeper phenomenological experiences of human freedom, spontaneity, selfhood, and creativity" ("Eudoxical" 45). Cybernetic fictions or "soft machines" (as per his *The Soft Machine*) dramatize the limitations of mechanism by adopting the guise of a cybernetic system and then self-destructing under the system's own rules, revealing the human remainder that cannot fit into an algorithm. These tend toward Porush's Eudoxical discourse, in that they "[adopt] scientific metaphors [to] expose the limitations of reducing a metaphor to formal algorithm" ("Eudoxical" 46).

Cybernetics in turn influenced neurology with its highly contagious metaphor of the nerve as a telephone wire or binary on/off switch, able to convey quantifiable, discreet packets of information. Responding to recent scientific developments, Porush deconstructs these cybernetic metaphors for the nerve to highlight the nerve's newly discovered non-deterministic, self-organizational abilities also definable as autopoietic. Based on the new research regarding the human nerve cell's open "ecological system," its "intelligent," nonlinear complexity and its structural self-malleability, Porush offers a new metaphor for the nerve:

> I would like to suggest that the best metaphor we have for the nerve is one that would include or subsume all its mechanistic aspects or behaviors but preserves a sense of contingency and self-modulation that we are beginning to suspect is true of human communication at all levels, from the micro- to macroscopic. I suggest,

106

then, that *the best metaphor we have for the nerve is metaphor itself"* ("Eudoxical" 49, italics in original).

As the mediator between the physical world of experience and the mental world of cognition, the nerve acts as a metaphor in the translation from perception to cognition, consistent with Nietzsche's formulations. Porush founds his entire Eudoxical discourse on exactly this function of metaphor as the "best empirical model we have of any phenomenon" valid on both the neuronal and cognitive levels ("Eudoxical" 50).

Metaphor-based literary discourse is proven to better reflect the unstable, fluctuating evolution of human culture, Porush believes, by the new theories of chaos showing how order emerges out of disorder and evolves into intricate, unpredictable complexities. Chaos theory describes a biosphere which engenders human culture which engenders literature, all according to the same non-deterministic laws of interaction, feedback and randomness. Literature is not only on par with science in its ability to describe the perceived world, but it opens up the world of the irrational to us, which Porush shows to have been crucial to the fundamental mathematical principles underlying scientific reality, but which science alone could never have allowed. He describes how Eudoxos of Knidos invented hyperreality in the 4th century BC by manipulating the Pythagoreans' metaphor of the number line which was applied to the measurable world. While the geometers rejected any number that was not an integer on the number line or a ratio between integers, that is, any number that could not be used to directly measure the physical world, Eudoxos challenged the Pythagorean system of rational numbers by turning the metaphor of the number line on its head, prioritizing the reality of the abstract line over the reality of the material world. Thus any numbers that fell between the

rational numbers on the line were allowed to exist even if they were incompatible with

the external world of objects. For Porush, Eudoxos' contribution was in providing a way

to think about √2 and other "nameless absurdit[ies]" that opened up whole branches of

mathematics; it was in creating "a rational theory of the irrational founded on the

inversion of a metaphor" ("Eudoxical" 56). Only metaphors were able to describe such a

world, where the map becomes more real than the territory, and metaphorical literary

devices achieve this self-reflexively, depicting and enacting their own discursive and

epistemological power. Ultimately, Porush concludes, science must take back the

metaphor as part of its method in order to delay its impending collapse and advance its

goals of "mapping the territory," and literature must accept center stage in culture as it is

tasked with producing not only new interpretations that are easily replaced, but new

knowledge ("Eudoxical" 60). Flusser's own metaphorical science of the *Vampyroteuthis*

makes objectivity more humane, and the repercussions for his readers are unpredictable

but profound over the course of their slow self-recognition. The autopoietic potential of

metaphorical creativity highlighted here, however, may be even more productive seen as

a complement instead of pure antithesis to deterministic logical machines, as explored

below.

    Hypothesis #3: The only way is forward, and Flusser's urge to insert more

human freedom into the spinning of webs should be redefined in the current cultural

context to include the influence of machines. Even though Flusser feared most the

subordination of human will to machines, technology must first be accepted and

integrated into any attempt to redirect the course of cultural evolution. Potentialities can

be realized through machine technologies because they are direct manifestations of our

linguistic realities, Flusser would agree, and yet perhaps can draw out and actualize potential worlds that otherwise our words would not hit upon. Like hypotheses 1 and 2, this approach too is rooted in the natural world and its human filtration, like any web-spinning manual would be. After all, in the cultural environment of our second nature, the biosphere and the technosphere evolve entwined. Flusser's metaphors crossing traditional nature-culture boundaries appear to support interpretations of his theories on human linguistic-technological culture that he seems to suggest but did not foresee. For an orientation with which to spin new, more human webs, perhaps nature, humans, art and machines must all interlace to produce the second nature he predicts.

Flusser roots his cultural theories in natural metaphors to describe how humans filter nature's chaos through their pores, like his early arboreal model for reality-building in which all selves are trees (*Língua e Realidade* 46). In this model the tree-self is rooted by the senses in the fertile loam of "raw data" or chaos of reality before that reality is comprehended. The information that is filtered through the radical pores journeys up the trunk or the intellect, enacting the *Ursprung* or crucial jump across the abyss that exists between raw data and word-thoughts. Once this informational "sap" reaches the crown, Flusser instructs us, it is integrated into the leaves, fruits and flowers of the mind, spirit or intuition. While this image acknowledges correspondences between vegetal and human cultural growth, it is not sufficiently developed to explain the translation process that is the foundation of web-building. Not until the metaphorical jump between chaos and concepts is illustrated further in his cellular metaphor do potential directions for reality-weaving come to light.

Flusser turns yet again to biology to show how the human intellect, even in all its neural complexity, functions like a single-celled organism in a very specific way (*Vom Zweifel* 38). His extended metaphor illustrates the aforementioned naming process by the intellect in which poetry's proper names, concrete manifestations of the inarticulable abyss, are called or abstracted into conversation. This linguistic process functions similarly to the digestive system of the unicellular amoeba, Flusser posits, which takes in nourishment from the environment and metabolizes it into usable energy to live and replicate. According to Flusser's model, the single-celled animal engulfs foreign objects, these proper names, in its vacuoles and digests them into the protoplasma of conversation, that is, into common names, words and concepts. The conversational digestion process analyzes, critiques and abstracts verse into prose. The amoeba model implies that critical analysis breaks up a whole into more useful parts, invoking an image of dissection that Flusser clearly connected with rational categories. While these pieces of dead poetry are necessary to the amoeba's and the human's functioning, they can accumulate if out of balance. The only solution Flusser suggests to cleanse the culture-sphere of conceptual waste is to un-name things, to critique this process of critique, to doubt this doubt—which would be an "anti-poetry" or a falling into the inarticulable abyss. Indeed, starting again at the abyss to allow poetry another go at spinning threads and rearranging our pores could lead anywhere without a trusty conceptual map, but I believe there is another possible orientation latent in Flusser's metaphor of the amoeba.

One of the roles nature metaphors play in Flusser's work is to suggest that an understanding of cultural phenomena is enriched by an understanding of the natural phenomena that are so much a part of our environment, regardless of how little we

recognize the full extent to which they surface at the cultural level. Whether patterns of

wen or dissipative structures, the metaphorical leap across the crumbling nature-culture

boundary creates new connections from which new paradigms can evolve over time.

This was possibly Flusser's intuition, the reason human culture only seemed to make

sense metaphorically linked to nature. He does not reflect on his use of metaphor per se

but the seeds are there for a growing, organic scientific-artistic culture that more

accurately fits with the changing times. His metaphors perform a kind of intuition upon

which whole cultural edifices can be built from the inside out.

Unicellular organisms, for example, are odd creatures. Some, like the amoeba,

have no definite shape and move by morphing their flexible, growable membranes in

search of food. Others, like the simple slime mold cell, can join with other slime mold

cells under the right conditions and move together as a single multicellular super-

organism. I want to extend Flusser's cellular metaphor to make a leap from biology to

human culture in the telematic age in the search for a new orientation with which to

restructure a second nature that keeps a sense of the human intact. The amoeba digesting

chaos into conversation makes sense to a certain point, but humans, among other

differences, are not solo swimmers in the frothing ocean of pre-information but always

social beings. Humans, particularly in the telematic age as Flusser describes it, build

their culture through connections to other humans, weaving their realities from inherited

and collaborated theories and texts, some centuries old. The whole fabric of the telematic

reality is the structure of information flow. What if the amoebas communicated with

each other? What if they were able to build super-organisms like the slime mold? Would

this better illustrate Flusser's telematic creativity?

The principles of emergence describing the phenomenon of self-organization in living and non-living beings have been observed in nature and culture at many different scales—in cities, anthills, software and brains, as well as slime mold. They model the way extreme complexity can arise from very simple starting conditions, something that cannot be predicted by looking at the individual pieces of the puzzle. The whole is much, much more than the parts. Emergence, as described by Steven Johnson, models the evolution of structure and patterns without a central authority dictating the moves. In sufficient quantities, very simple entities following very simple rules can act as a group, evolving and adapting to the environment as a single entity, organizing from the bottom up. No one is observing from above and giving orders, but each individual following its own goals, like a motorist trying to get to work, interacts with others of its kind to unconsciously generate overarching organizational patterns, like traffic jams. Johnson narrates the translation from the equations for slime mold aggregation calculated in the 1960s to more recent computer algorithms that can successfully simulate slime mold behavior in pixels: tiny red dots leaving green trails of "pheromones" on the screen that other "cells" would encounter randomly and accordingly alter their behavior to maximize their access to "food"—just like on a rotting log in the forest. Following this kind of unconscious, bottom-up organization, computer programs that act like slime mold super-organisms can learn and evolve on their own in fulfillment of some task. This emergence of higher-level order, of meta-organisms or intelligences Johnson sees in nature and culture alike: "We like to talk about life on earth evolving out of the primordial soup. We could just as easily say that the most interesting digital life on our computer screens today evolved out of the slime mold" (17). Emergent behavior has always been a part of

complex systems in nature, whether tornadoes or anthills or our own bodies and brains, but human culture is successfully creating artificial emergence in computerized systems designed to exploit the phenomenon in order to read patterns in human behavior and accomplish other tasks too large and complex for the human mind. "Up to now, the philosophers of emergence have struggled to interpret the world. But they are now starting to change it" (Johnson 21).

Flusser's point is that after we recognize how our cultures or second natures are created by our own metaphor-based language, we have the responsibility to take an active part in destroying toxic conceptual structures that no longer fit our needs and hold us back from growing in new directions. I only submit that the understanding developed here of the way human beings weave a textual reality from perceptions through metaphors into language must be combined with an understanding of the way individual textual realities interweave—always to some extent unconsciously—to spin the interconnected webs of culture. Flusser's portrayal of the oncoming telematic future supports a view of humans' second nature as an interconnected flow of information which organically evolves according to the principles of emergence. Turbulence, itself emergent pattern in chaos, has always been a hallmark of a messy, complex human culture that applies equally well to Flusser's models of the chaotic roiling pre-linguistic ocean of possibilities out of which emerge self-organized systems like living cells and brains and the products of brains and super-aggregates of cells. Not individually, but taken together Flusser's metaphors overlap nature with culture and overlap with each other to illustrate his theories and his vision of reality's text and humans' role as weavers.

Interweaving Art and Science

Cultural text production depends on how we understand information contextualization, or how meaning congeals from the ocean of chaos. One aspect of meaning creation that presents itself in the present examination is the compatibility of scientific and artistic texts in their powers of representing our second nature. Another is their combined power to perform as well as describe reality. This ends up not merely illustrating, as it sometimes does, but in every case actively building cultural structure and quality, as even representations themselves create and spread ideas. When Bernhard Dotzler comments on the interplay of science and literature in weaving together networks of knowledge or reality, and that both epistemological methods are themselves equally historical and valid networks of reality, he agrees that "[a]lle Literatur ... 'transportiert sehr viel Wissen' ... [u]nd sie transportiert es nicht nur, sondern sie prozessiert das Wissen auch. Sie verändert es, statt es bloß widerzuspiegeln" (319). The "two cultures" need not only describe reality in parallel, but can communicate to produce new knowledge beyond the culture border. Theo Elm also emphasizes the importance of reading fiction and poetry for scientists—literature's references to technology in its forms of montage, randomness, nonlinearity and fractal structures is very close to our technological reality, and can even serve as a prognosis of the catastrophic potentials of our culture (56, 63). As low-risk models of potential future states, literature can play out scenarios that science safely cannot. Catastrophe this time marks a culture in transition, however, not in decay. In an age of crises of faith and doubt in permanent truths, the cultural fabric appears at first glance to undermine its status as reality and perform a distraught disorientation that mirrors a disorienting reality, and that itself disorients. Truly, as past decades of science and literature have shown, some trusted paradigms and

traditional conceptual edifices have been demolished, some have eroded and some

continue to suffocate. But according to Flusser, catastrophe and disorientation are only a

few of the possibilities of any culture's present state at any given moment, regardless how

the turbulence might appear to any single observer within the system. I believe the

scientific and artistic literature, in blurring some boundaries, have redrawn other

blueprints for reality, this time ones with holes left open for randomness and emergent

patterns that must remain unpredictable.

Cultural text production has also always involved interaction with nature,

negative, unconscious or otherwise, the result of human beings filtering information from

the environment. Culture arising out of nature, minds arising out of matter, humans

create sense in order to survive and thrive in a world made of bodies and ecosystems.

From the perspective of cybernetic theory, David Porush reminds us, information must be

redundant enough to produce patterns, and input slow enough to be digested by Flusser's

amoeba; only then is it meaningful. Texts are meant to be read and are a product of

reading—the act of reading creates meaning by filtering and slowing down the flow of

information so that it can be comprehended and woven into the fabric of the intellect, to

use Flusser's word. Every theory is just a linguistic filter through which to organize and

make sense of information from the noise around it, Porush claims, and every observation

presupposes a theory, as Goethe believed (*Soft* 67). Thus every instrument of technology,

built in accordance with observations through linguistic filters, is partly the embodiment

of a theory about how to "read" nature's text (Porush, *Soft* 67). That is where science

(whether kabbalah and alchemy or structuralism and AI research) reflects on its linguistic

structure, in the search for a universal scientific language of as much "orderliness" as nature itself exhibited in its forms and processes (Porush, *Soft* 4).

Axel Goodbody examines how literature too pursued a translation between nature's language and human language much earlier in the work of writers like Paracelsus, Jakob Böhme, Goethe and Novalis (30). Later also what he terms Heidegger's ecopoetics gave poetry the task of articulating the silent language of nature that is actually latent in human language through the act of naming, of preserving by giving form to what had not yet been expressed (Goodbody 136). Goodbody cites Kate Rigby's examination of poetic naming which must aim to de-center the human subject as opposed to ordinary language which is used to control nature. Rigby's poetic naming is similar to Flusser's naming process both in its task to first foreground the materiality of language, its sounds, rhythms, metrical and phonetic patterns, and then to weave a web of different meanings that serve to mimic the complex interactions found in natural systems, eventually centering language upon the world outside of the text, the sounds, motions, colors and forms of the earth. For Rigby, the ultimate goal of poetic naming is to acknowledge in such an attempt that human language just cannot express all that exists in the world, and in granting the imperfect correspondence between word and thing, the text should prepare to fail to orient the reader, falling into the incoherence of form without content (Goodbody 139-140). When the crisis of disorientation arises as old filters are applied to a changing natural-cultural environment, it is for Flusser more productive to look for alternative orientations legible and writable out of the ocean of chaos—new orientations that will one day be replaced with newer. If science has discovered a universal language that can be broken down or recombined to represent the complexity of

116

the current nature-human ecology, it could be the coding of linguistic processes into binary code. With its use in solving problems that resemble human thought, and in creating whole artificial worlds that can almost be perceived as real, the binary code has already begun to restructure human experience through its own filter. The grammar that could craft the code into algorithms that allow for chaos and unpredictability would be the principles of emergence.

Webs Emerging from Metaphor Machines

The concept of emergent properties effortlessly links digital computer technology and turbulent nature in a manner that productively supports Flusser's second nature and the metaphors that create it. Important for this natural-digital union is the understanding of cultural text production that weaves together whole civilizations not only as rooted in the natural world, but also as functioning according to semi-mechanistic cultural rules. To this end, David Porush's reconceptualization of texts as "reality-describing machines" presents a provocative model of literature as a process of meaning-making that in effect coagulates and synthesizes information from the chaos of the cultural environment. As machines, cultural texts are self-reflexive "illustration[s] or incarnation[s] of a rule set" for creating meaning (Porush, *Soft* 15). As a representation of some internal state, as a communication between authors, readers and societies, and as a coded model of the techniques or methods that combined to create it, the text can be seen as an artificial intelligence (AI) device, so Porush. The text, like language itself, is under his definition a "soft" or vulnerable machine, both rigid and flexible like the human body—structured by rules but open to the outside, open to change, and often unpredictable. In an open feedback loop always adapting to the environment, the text could be viewed as a culture

machine that runs on metaphors, an "anti-mechanistic technology" or a cybernetic device that aims to demonstrate that human expression cannot be modeled deterministically or algorithmically ("Dissipative" 275). Taking mechanism to its logical extremes, cybernetic fiction running on structured language manages to create silence, canceling out code by writing opposite codes over each other to "dismantle" the machine, babbling in "cut-up" language or increasing the bandwidth—adding noise or randomness to increase entropy in the system (*Soft* 103-110). These anti-mechanistic techniques throw a wrench in the deterministic machine of scientific certainty in a manner similar to Flusser's anti-linguistic process of un-naming. Just so can art join science and technology in a way that supports Flusser's concept of a second nature and that also has the power to reorganize our conceptual webs. Bringing the engine of language to a standstill, silence in the machine clears space for new rhythms to emerge.

Much more than a machine that runs itself haywire, Porush's soft machine of literature uses metaphors to create new meaningful structures, or rather new meaning is generated through metaphor from the textual collisions of unrelated things. Initiating a "positive feedback loop of exploding interpretation," metaphors "crystallize meaning in multiple directions," feeding off themselves to expand into territories previously uncharted by the old frameworks (Porush, *Soft* 128). In short, Porush's textual "chaos machine" is both a cybernetic machine that creates meaning out of noise from the cultural environment, and a naturalistic dissipative structure (Prigogine's concept from chaos theory) in which an unstable flux of information spontaneously gives rise to meaning ("Dissipative" 293). Grounding a new reality in machine processes should be considered now not incompatible with the turbulent, organic life that rules nature as we know it. A

new perspective on an interconnected nature-culture like that afforded by Flusser's writings is first required to move ahead into the future telematic possibilities realizable in anti-mechanistic technologies. Flusser's metaphors support this understanding of human technological culture's roots in logical rules and anti-mechanistic chaos, and the equal roles that science and art share in knowledge production.

The final step thus leads back to the vampyroteuthis. To fully correspond with Flusser's vision of human creative freedom in the building of our second nature, we must return to our vampyroteuthian side. This creature—myth, metaphor and science in one—in whose collective memory remains the tendency toward anthills, is born in clusters of countless siblings and carries within itself the struggle between individual freedom and egalitarian cooperation. Flusser's typically numerous contradictions within the treatise on the vampire squid blends a glorification of the animal's intersubjective communication and a demonization of its "hellish anthill" socialism (*Vampyroteuthis* 58). Flusser's telematic society, however, requires such an interdependence between individuals, as without a receiver there is no sender of information, and things, organic and inorganic, are only "knottings together" of relations ("The City" 235). The more interdependent, the more interconnected and the longer information is protected from entropy in the immaterial "knots" in the net. Embryonic squids, amoebas, or plankton in the ocean of chaos, Flusser's metaphors together generate new blueprints for web-spinning in the minds of his readers. At the microscopic scale, the textual fabric of human culture is made up of perceptual and conceptual metaphors which make up the human/arachnid nodes in the overlapping fields of relations, and the spiders in turn spin webs out of metaphors at the scale of human experience. A macroscopic or universal view would see

webs interweaving with webs, if they were visible at all, and the emergence of something unpredictable and chaotic taking shape via countless engines of linguistic creation: a second-nature super-organism.

Just as brains emerge from the communication between neurons, anthills from interactions between individual ants, and tornadoes from interactions between distant air currents, there is no predicting what direction the potential nature-culture super-organism could take, what dangers lie dormant and what creative freedom is possible in the emergent meta-webs. Flusser's metaphors are woven in the direction of interlocutors who must take responsibility for understanding metaphor's methods and mechanisms and consequently for redirecting the fabric towards a more human balance of forces. His own writing, however, leads in paths even he could not foresee, for that is the work of metaphor in a text. While Flusser calls for humans' individual freedom to decide and create, his theories, language and metaphors suggest the possibility of something less independent and more interdependent with machines and nature. If there is a sense of resignation in Flusser's call to broadly fight the good fight for humanity, it need not be read as an acceptance of the inevitable collapse of freedom under mechanism and chance. Instead, through metaphor-based texts and technologies, larger systems may emerge spontaneously from the chaos of *Bodenlosigkeit* in ways that require and produce a greater degree of interconnectivity. Flusser's allusions to a united world memory or global nervous system clarified in the previous chapters permit an understanding of human culture as a potential super-organism of intersubjective communication. If humans are still to insert their creative intention to the whole, we might not be able to

predict and control the emergent structure of the webs we spin, but we can always

experiment with how we program the algorithms.

IV: Sand

The Digital Connection in Nature, Technology and World Creation

Under the microscope, nature and culture at the molecular level both look the same to the Flusserian eye. This perspective affords the kind of creativity Flusser imagines for the immediate future of his telematic society. The first chapter of this study examined through Flusser's metaphors how human culture re-synthesizes nature's bits and pieces into a negentropic, purposefully directed second nature, a seamless nature-culture blend. The second chapter explained that when the world is understood as both natural and artificial, science and art can play equal roles in the creative synthesis. The third chapter showed how this combined epistemology helps humans understand nature's bits and laws enough to playfully nudge them into improbable configurations. Relying on both metaphor and machine technology to allow these configurations to emerge brings the creative impulse further by explaining the world as something we ourselves project and can therefore change. These interconnected paradigm shifts Flusser so adamantly urges work to effect a shift in how humans perceive the world; it makes us aware of our porous skins. Flusser's method of merging opposite concepts like nature/culture and art/science overlaps very different conceptual nets to create new information filters with different-sized holes through which different-sized bits of information may flow. Once we recognize that we can alter our filtration nets, and thus the world we perceive, once we know the rules of the game and possess the tools—to use his terminology—all that is needed are the parts, the playing pieces.

This final chapter examines closely the last stages of Flusser's media philosophy from the late 1980s and early 1990s as it breaks down humans' entire second nature into

its tiniest parts to reveal aspects of a digital structure in what are often considered non-digital phenomena. Seeing the same digital structure in nature as in computers means for Flusser that humans can digitally manipulate and even re-create substances and life forms of natural origin in fulfillment of human cultural desires and requirements. The digital connection Flusser finds between computer technology and nature can be problematic if it alienates or deceives human beings, he warns, or reduces living things to random piles of isolated cells and genes, but he emphasizes rather that the relationships between particles are the real meaning and substance of life. New patterns, objects and even life forms can be created by manipulating pixels, cells and genes as part of an interconnected whole, a system out of which unpredictable novelty can emerge through the interaction of chaos and machines. Understanding the world as digital allows humans to recreate it with their digital technology not against, but in cooperation with nature's laws. An examination of Flusser's understanding of digitality in nature and its connection to digital technology will be supported by additional theoretical approaches to the digital in nature and ultimately applied to concrete examples of artistic practices Flusser could only imagine. This analysis, then, will serve not only to further explain and support the preceding sections of this study, but also to draw out future directions for human creativity inherent to Flusser's metaphorical media philosophy.

Flusser's Digital Nature

At the most basic level, Flusser views natural and cultural phenomena alike as clusters of particles that can be broken apart and rearranged into other relational configurations. As explained in previous chapters, his metaphors describe the world as watery clouds of trembling plankton particles or grains of sand that congeal into islands

and dissolve again in an entropic cycle of random, temporary information creation, a process humans want to harness to purposefully play chance against chance to conquer entropic death. Many of his metaphors treated earlier in this study can be overlapped to focus on the same referent, the world as tiny specks full of creative potential for human beings. Flusser's call for art to take us back through the un-naming process to the pre-conceptual or pre-filtered wordless soup from chapter three parallels his call for a conscious return to the bubbling broth of unrealized possibilities with the creative *Schöpflöffel* from chapter one. Seeing the world's particulate nature, Flusser sees not objects but objects that could be: the borders between objects dissolve and the eye might easily arrange the particles into other configurations. Zooming in this close on reality makes reality not disappear, Flusser would say, but a little less real, to the point where other realities would be equally possible.

Seeing this particle mass is all a function of human rationality, which according to Flusser's etymological analysis stems from the ability to cut things up into rations ("Das Ende" 53). After scientific reason divided objects into atoms and individuals, "(Man vergisst oft, dass 'Individuum' und 'Atom' synonym sind)," it later proved itself "schneidiger:" the cutting turned eternal, atoms turned into neutrinos and quarks, individuals into actomes and decidemes, and in the end they all started to lose their reality ("Das Ende" 53). In this way, Flusser wants to see the whole world as a mixed-up cloud of indistinguishable animal-vegetable-mineral particles. Of utmost importance here is not to stop after this dissection into the unreal subjunctive cloud of isolated particles and lose one's orientation in an absurd *Bodenlosigkeit*, but to reassemble them (or prompt

them to reassemble themselves) into a networked ecosystem through a combination of

art, technology and nature's blind chance.

> Ist ein Quark, dieses Atomteilchen, nicht eher so etwas wie eine Gleichung? Und ist ein Aktom, dieses Teilchen einer individuellen Handlung, nicht eher eine objektive Bewegung, wenn ich es in einen Roboter gefüttert habe? In diesem Teilchengewimmel verschwimmen Atome und Individuen, Objekte und Subjekte, subatomare Prozesse erweisen sich als von individueller Beobachtung abhängig, und Maschinen beginnen, wenn mit Dezidemen gefüttert, Schach zu spielen, sich zu entscheiden. So kommt die Vernunft, auf dem langen Umweg durch die Wissenschaft, darauf, was die Worte schon immer wussten: Subjekt und Objekt sind relative Begriffe, Atome und Individuen sind Fiktionen, und real ist das Verhältnis, der Sachverhalt, die Subjekt-Objekt-Vernetzung. ("Das Ende" 53)

Here are the nuts and bolts behind his theories of intersubjective relational fields and

immaterial information exchange presented previously: it all comes down to the relations

between the tiniest particles, their abstract, calculable nature. The calculi are the playing

pieces in this game of second nature—what can calculate can create.

Even before our powers of abstraction and rationality, perceiving the world in

particle form is for Flusser always also a function of the physical human body. Flusser's

microscope examines the human brain and sensory organs as conglomerations of digitally

distinct calculi all working in the function of calculation—information that processes

information, natural beings creating culture naturally, digitally. Because the sensory

nervous system "empfängt punktförmige Stösse," that is, "digital kodierte Reize" or

"Informationen," perceiving an object as real just means that the central nervous system

has sufficiently "computed" or "processed" the incoming information bits ("Das Ende"

53). "[D]ank zum Teil schon durchblickter elektromagnetischer und chemischer

Methoden," Flusser writes of the central nervous system—not of a machine—"[werden]

diese Reize, diese Informationen im System prozessiert, um verschiedenartige Komplexe

zu bilden, etwa Wahrnehmungen, Empfindungen, Gefühle oder Gedanken" ("Das Ende"

53). Furthermore, the central nervous system itself Flusser reduces to a swarm of point

elements which receives and computes the similarly-shaped point elements of internal

and external stimuli. As both sides of the subject-object relation are of the same stuff,

Flusser would say, perception has really to do with an overlapping of multiple fields of

possibilities, to use his term—now more real, now less real: dreams differ from waking

life only in that they are more poorly processed by the central nervous system.

As bodies and environmental stimuli blur into one and the same "foaming" ocean

of possibilities, subjects and objects are only real to varying degrees, Flusser writes.

Everything, including humans, is so saturated with this ocean that from up close we are

all made of water:

> Dieser Ozean von Möglichkeiten, worin wir schwimmen, durchdringt uns. (Wie
> ja Tiefseeorganismen, wenn analysiert, sich als spezialisiertes Meerwasser
> erweisen.) Das, was wir "ich" nennen, ist *eine* unter den Wellen des Ozeans der
> Möglichkeiten. Die Wellen toben und schäumen, weil jede vom Drang erfüllt ist,
> immer wahrscheinlicher zu werden, immer   näher an diesen Grenzwert zu
> dringen, den wir "Wirklichkeit" nennen. Dieses Drängen und Schäumen der
> Wellen, dieser Drang der Möglichkeiten nach Realität, heisst "Zukunft" ("Das
> Ende" 53).

Again the creatures of the deep come to our aid in observing our own kind, here the

human subject is a "floating island" in the ocean of possibilities that grows more real the

more "waves from the future" break upon our shores ("Das Ende" 54). Neither self nor

world ever reach reality's hazy horizon, remaining only temporary constellations of

points, "extrapolations" from the undulating ocean of possibilities, "Leichen, die aus dem

Toben der Virtualitäten herausgefischt wurden" ("Das Ende" 54). Because bodies and

minds are no longer Whats, but rather Hows—not things, but processes by which

"virtualities," potentialities, are realized—technology need not focus on changing things

in the world, Flusser insists, but can instead create whole other "real" worlds like Aphrodite out of foam.

At Flusser's moment in human history, the realness continuum and the turbulent waves of the possible must be digitized in order to be manipulated. Writing just at the end of his life, in the last decade of the 20th century, Flusser already sees technology creating digitally, so that he writes that quality must be converted into quantity, and the world, Aphrodite's "schaumgeborene Schönheit," must be recoded into numbers, blown apart to its tiny bubbles ("Das Ende" 54). Reality is a function of probability, Flusser explains, something that can indeed be quantified. The more improbable something is, the more information it contains, the less entropy is present, and the closer together the molecules are located—for, as Flusser defines it, "'real' sei eine Funktion der Dichte der Streuung von Virtualitäten," a function of the relative distance between atoms, molecules, pixels or otherwise ("Das Ende" 54). When the stimuli are more densely distributed, or as Flusser says, better defined, they will be processed in the central nervous system as real, he explains, whereas a looser distribution will be registered as unreal. If a wooden table is perceived as more real than a hologram of the same table, Flusser writes, it is only because the technology of the holograph has defined the stimuli more poorly than the central nervous system can process it, a circumstance that will change in the future. Flusser imagines a future in which "unser Zentralnervensystem definiert aus den Möglichkeiten eine Welt, die wir als real wahrnehmen, und andere Systeme definieren andere, alternative, ebenso als real wahrgenommene Welten" ("Das Ende" 54). It is a question of quantity, of density of distribution and condensation, by which Flusser means to say it is a question of processing chance.

Flusser's project for humanity rests in part on what he sees as science's return to Democritean atomism, where all things are created by chance particle collisions. According to Flusser's customary etymological analysis, Democritus believed that "alles sei ein Produkt des Zufalls. Mit 'Zufall' meinte er, was das Wort sagt, nämlich das Zufallen eines Teilchens auf ein anderes. Die wie Regentropfen parallel fallenden Teilchen weichen ein wenig von ihren Bahnen ab, fallen zueinander, und so sind überhaupt alle Sachen entstanden" (Flusser, "Das Ende" 54). Further, the process by which humans and their central nervous systems arose is for Flusser too improbable to be explained by chance alone, although such explanations correspond to some of the most recent scientific theories on the origin of life and the universe. Linking chance with necessity, Flusser figures that all possibilities must necessarily come about when the universe operates according to the laws of chance—it is only a matter of time before all possible configurations of particles would randomly, and therefore necessarily, occur. All possible worlds, so Flusser, must necessarily emerge randomly from the ocean of possibilities over the course of a sufficiently long span of time. Contrary to negating all value in purposeful human creation, however, this formulation actually fundamentally supports Flusser's central emphasis on the importance of humans' artistic creative freedom. Understanding the science behind nature's ways, as far as it is possible, makes clear that intention is necessity inverted, that "'Absicht' meint jetzt den ausserordentlich beschleunigten Zufall," purposefully skipping steps in nature's random sequence of particle collisions ("Das Ende" 55).

A direct consequence of humans' power to accelerate chance groupings of atoms and molecules is Flusser's belief that living organisms can therefore just as easily be

created as nonliving objects by inverting nature's laws—that the course of genetic

evolution can be manipulated in exactly this way with technology sufficiently advanced.

Creative computation turns necessity into intention, the uninterrupted slow progression of

random particle collisions into improbably accelerated chance. When biological

evolution is a dice game, Flusser reasons, when the playing pieces are genes and all

possible genotypes must necessarily and randomly arise, the evolutionary game "lässt

sich numerisieren, kodifizieren, und in Computer füttern" to be so processed that what

would take billions of years may pass by in a number of hours ("Das Ende" 55).

Previously unimaginable life forms should emerge from the ocean of possibilities with

the slightest tweak of an algorithm and its expression in genes expressed in phenotypes.

This, perhaps Flusser's most surprising, if not "somewhat Utopian" example, as he admits

himself, should eventually contribute to whole "alternative" ecosystems being born from

the frothing ocean of not-yet-realized potentialities ("Das Ende" 55). The same basic

process of accelerated computation of chance conditions underlies cyberspace, virtual

reality and other simulation capabilities Flusser mentions, that were just emerging when

these words were published in the year of his death. With these examples Flusser means

to herald a new form of creativity based on quantifying qualities, recoding experience

into theory, and calculating probabilities. Such game strategies will allow us to create

alternative worlds—"alternative Räume und Zeiten, mit alternativen Sachen und

Lebewesen, und (warum nicht?) alternative Menschen" and has already begun to free us

"von der Tyrannei einer angeblichen Realität" ("Das Ende" 55). Freed from reality's

unattainable horizon, the constraints of selves and objects dissolve into "lauter sich

häufende und überlagernde Seifenblasen," and creating whole worlds from the foam of

our particulate second nature evolves humans in turn to a *homo ludens*, "eine zweite

Menschwerdung" ("Das Ende" 55). Instead of despairing as our sense of reality

vanishes, we are freed for a life of the ultimate artistic creativity.

Regardless of what Aphroditean beauty we may birth from the semi-real foam,

however, Flusser cautions that no new worlds will be intrinsically any more meaningful

than the first one, and humans must not expect to become any less absurd. Such a view is

in fact the very precondition for our creative freedom. One of two strategies Flusser

presents for surviving worlds acknowledged as changeable yet absurd, the evolution to

homo ludens permits us to throw our button-pushing fingertips into the swirl of nature's

game of blind chance and speed it up to our delight, deliberately manipulating the playing

pieces simply to amuse ourselves. If "dumb nature" were to automatically realize all

possibilities contained within it regardless of human intervention, "[w]e can produce

wonders a little more intelligent than the idiotic wonder of nature (of which we ourselves

are a good example): a little more intelligent atoms, molecules, living organisms, human

beings" ("Wondering" 107). The artistic response is that of the *homo ludens*. The

second strategy for surviving a world perceived to be absurd is to confront it "by going it

one better:"

> let us be deliberately absurd. Let us admit that science and technology are absurd
> gestures, that "artificial" wonders are absurd wonders, and let us make these
> gestures and produce these wonders precisely because they are absurd. This is a
> familiar answer, aphorized long ago by *credo quia absurdum*: I believe it because
> it is absurd. This is the answer given by *homo religiosus.* ("Wondering" 107)

Thus, all possible realities are open to us in our search to weave a cloak of humanness

over the abyss of *Bodenlosigkeit*. When one reality web randomly, entropically

disintegrates to its absurd parts, a more appropriate one can congeal that forms new

connections and new meanings, even if only temporary. What matters for Flusser are the complex connections between selves/things, a rich intersubjective field of relations processed at the microscopic level. Digitality, defined more extensively in the following sections, pervades Flusser's nature as a mass of particles that interact dynamically, and once understood, can be rearranged by humans into more meaningful relationships.

Computing Nature

Breaking apart the environment into bits, digits or atoms opens nature to direct manipulation by computer technology. The particle nature of the raw materials combined with the process of calculating the particles' collisions provides the fundamental tools with which artists/scientists may intentionally accelerate the accidents of nature to produce new, temporary, but perhaps more human worlds. When Flusser explains the particulate universe in detail, he bases his description on the general big-bang and heat-death theories from physics, narrating the process in his own terms as an expansion of a "cloud of gas and dust particles" spreading out towards ever-increasing entropic heat death, which despite the name, actually refers to a lack of heat and information where all particles of matter/energy are uniformly distributed, that is to say, too far apart to cohere into objects ("Wondering" 106). Random but necessary collisions create temporary clusters of particles that synthesize information in the form of molecules, planets, organisms and the like, only to subsequently degrade and dissipate again as entropy gradually and inevitably gains the upper hand. The whole effect of Flusser's take on the birth and death of the universe gives his reader a sense of a smooth flux of particles alternating between density (things) and sparsity (nothingness).

> We may call the particles "energy" and the clusters "matter" if we keep in mind
> that these terms are relative to each other, for "matter" is closely packed energy,

and "energy" is loosely distributed matter. The pattern followed by the spreading cloud can be plotted as overlapping   fields of particles, clusters, and emptiness. We shall then find that we ourselves are clusters wherein several fields intermingle. ("Wondering" 106)

Fitting together a smooth flux of time and distinct particle clusters into constantly changing matter-energy fields, Flusser manages to emphasize the quantifiable nature of life's mysteries.

Particles, human beings and planets, that is to say, can all be plotted as wavy field grids at a level of definition only possible on electronic processors. Crucial for Flusser's creative project is the access to computer technology that can calculate the algorithms describing the actions of these particles. Such technology first allows humans to visualize the translation from algorithm to universe in ways previously impossible. Simply by typing the algorithms governing nature's physical laws "(Einstein's relativity equation, and so forth)" into a computer programmed to carry out the mathematical tasks would cause apparitions like "[w]irelike nets...to show the patterns of the fields" and "baglike protuberances" in the nets to be actualized on the computer screen ("Wondering" 106). The protuberances, Flusser explains, should be read as heavenly, vegetal, animal and human bodies of varying degrees of complexity, all made up of the same subatomic bits in different configurations. All these forms arise and dissolve on the screen in a somewhat fluid motion that condenses millennia of galaxy formation into a handful of minutes.

If we "animate" the image, we may watch these protuberances form and complexify. Then, gradually they will grow shallower, until finally they fade back into the regular grid of the nets. The spectacle will end when all the net's irregularities have disappeared without trace, when the pattern stretches uniformly (without form) in every direction. If we feel like it, we may call this happy (or unhappy) end of our computer-generated video "thermic death." ("Wondering" 106)

Again writing very late into his career, Flusser finally finds in digital technology the means to visualizing his earlier theories of nature's entropy ("heat death") and culture's negentropy as elaborated in the preceding chapters.

Not only are digital computers essential for making sense of nature's complexities, visualizing its hidden order and chaos and reorganizing it into possible second natures, but for Flusser this is because they also share at their most fundamental level some of the same basic structures as nature itself. Beyond describing nature's particulate consistency and the random collisions that build and destroy its molecules, organisms and solar systems, Flusser goes so far as to equate the generative potency of nature's forces with the information processing capabilities of digital technology. The clearest example of this view is his metaphor translating wind turbulence into digital computation. The calculi, or small pebbles used for counting, are in this case truly both inorganic mineral compounds as well as abstract tools of calculation. Flusser's metaphor explains that the wind "calculates" the physical world, grinding it up into grains of dirt or sand and computing them like 1s and 0s into new combinations, "daß [der Wind] den faßbaren, besitzbaren Grund in Körner zerreibt (kalkuliert), diese zerstreut (dispensiert), um sie dann zu Dünen zu häufen (zu komputieren)" (*Von der Freiheit* 61). Flusser's obvious statement is that the chaotic natural world as it has existed since before human influence relies on the same strategies of digital computation that also govern humans' technological inventions. This further implies, however, that humans in coordination with digital computer technology need only to comprehend and extend nature's particle-calculating power in order to create a second nature that really is natural as well as cultural, a cultural extension of nature. To harness the turbulent winds of chance and

133

necessity is to intentionally sweep sand into dunes that would have occurred anyway, only much later.

Of course, from previous chapters it is clear that Flusser's crisis of science sees humans now doubting the eternal truth of nature's laws, as he suggests that the human scientific observer instead projects an invented order onto natural phenomena in order to explain them. It cannot be argued that Flusser was not fundamentally influenced by the burgeoning digital technology of his day before suddenly noticing everywhere the digitality in the organic world around him. However, Flusser's theories have always been above all a product of his own social and technological context, a fact he not only does not deny, but on which he bases his most fundamental claims. What he never forgets is that four-, three-, two-, one- and zero-dimensional codes are still always present in culture simultaneously in different ratios at different times, and because the digital code weighs in heaviest at this fleeting moment in the universe, it is digitally that we must explore our creative potential and our changed relationship with nature, others and ourselves. Smooth continua and analog processes must be converted or read through digital lenses at this moment, because that is the type of tool most highly developed, and their creative potential is far from exhausted. Humans' digital skin is but one way to filter, process, conceptualize and manipulate information, one well enough understood to inspire the imagination as well as be practically implemented.

Digitality Before Pixels

The digital logic of computer technology is by no means necessarily a natural phenomenon, but it can, also for other thinkers besides Flusser, describe some of nature's most basic structures and organization, and even that of some earlier technologies and

communication media considered non- or pre-digital. Reduced to its basic elements, the smallest building blocks used to create information, technology normally defined as digital is founded on the countless variations created by juxtaposing two distinct bits of information, Yes and No. It is regulated and produced according to programs which are numerical algorithms written originally by humans in a basic binary code of 1s and 0s. The discreet digits are either one or zero, yes or no, on or off – *tertium non datur*. Because of this elemental opposition, these digits can be combined and rearranged in innumerable ways to produce a wealth of information in spite of their initial simplicity. This translates eventually into computer programs which users operate on a higher level, that is, more removed from the binary code, which can be altered one piece at a time just like the ones and zeros upon which the programs are based. Since the most basic digital code is written into numerical algorithms which write the operational programs into a higher alphanumerical computer language which in turn dictate the formation of an interface between the human user and the machine readable in a commonly spoken human language, the foundational binary code disappears in the higher levels of programming to the users at the top. Eventually, someone who can neither read nor write nor make any sense of a binary code or even algorithmic and computer programs can productively use and manipulate text, images, sound and video files with relative ease.

It is true that without computers the binary code would not have all the applications it does today, but neither code nor computation machines were invented from scratch in Flusser's century. Digitality, if it may be called so, can be traced as a concept much further back in time, even without Flusser, and can be understood much more fundamentally in the distinction that Gregory Bateson makes between numbers that

can be counted and quantities that can be measured. Discontinuous integers can be accurately counted, avoiding the approximation inherent in measurements in general. Distinct integers or elements, therefore, are responsible for the formation of regular patterns and are the basis of digital computation. Continuous quantities, on the other hand, add an element of unpredictability to any sequence and necessitate analogical and probabilistic computation (Bateson 49). Bateson's point is that a balance of both digital and analog processes are necessary for the physical life of nature just as much as for the cognitive life of the mind, two worlds he wants to prove are intertwined in structure and function. In biological evolution, for example, all acquired somatic adaptations are quantitative (in his sense, as opposed to numerical) or analogical, while the DNA and the resulting embryological development it encodes for, the central nervous system included, can be considered digital in nature (Bateson 181). Further, human cognition, which he understands to begin with tautologies that develop into theorems, resembles the digitally patterned unfolding of embryology while the learning process involves a creativity similar to analogical biological adaptation (Bateson 221). Flusser might ignore the non-digital structure of human learning or creativity, but he also does not define nature as only digital, merely emphasizing digital properties over others also present. As such, an understanding of Flusser's view is well supported by Bateson's perspective which defines and recognizes digital elements and their commonly opposed analogical elements in natural processes far predating and much further beyond the phenomenon of electronic computing technology.

A number of other highly developed theoretical and observational analyses of digitality in the natural world existed many centuries before Bateson's 1979 synthesis.

Siegfried Zielinski undertakes an examination of some partially forgotten examples in his "anarchaeology" or "variantology" of media technologies and their theoretical foundations. He describes, for instance, how the theoretical physicist Erwin Schroedinger stressed the ancient Greeks' conceptualization of nature and emphasized the importance of Democritus' atomistic philosophy, all at about the same time that Alan Turing was inventing the forerunner of the modern computer (Zielinski 42). Zielinski's anarchaeological exposition highlights the Greek philosopher Empedocles, firstly, who thought of the natural world as an interaction between the forces of attraction and repulsion which mixed the basic natural elements in a constant flow towards and away from nothing in particular. All objects were then encased in porous skins which absorbed or repelled the constant stream of elements according to how the shape of the pores matched the form of the flowing elements. Democritus, considered by many to be the father of atomistic philosophy, independently conceived of a flow similar to that of Empedocles, with all matter, solid or otherwise, consisting of tiny imperceptible indivisible particles or "atoms" which are in constant motion in the void which surrounds them. Perception, however, was not immediate between the skins of objects/subjects (both the perceiver and the perceived are interacting with each other reciprocally), but rather the motion of the particles compressed the air between the objects/subjects to form a kind of image or interface. Similarities between Flusser's theories and the philosophies of both Empedocles and Democritus are obvious, the latter of which Flusser explicitly cites, as seen above. The continuously moving flow of tiny particles, porous skins that filter them and even the image between skins are not incompatible with Flusser's theories of entropic cycles, particle clusters and translational (metaphorical) perception.

Zielinski records that Democritean principles inspired Plato, Plotinus, the

Neoplatonic philosophers, as well as the later magical natural philosophers of the

fifteenth and sixteenth centuries (45). Later on, thinkers from the seventeenth century

like Anathasius Kircher, Ramon Lull and Wilhelm Gottfried Leibniz, inspired by theories

of the particulate distribution of matter and energy, drew up complex combinatorial

diagrams describing the world as a network of relations between things that could be

calculated as well as rearranged (Zielinski 118,143,147). While Leibniz created a binary

system around 1700 transposing the alphabet into zeros and ones, influencing later

attempts at long-distance communication with on-off blinking lights and sounds,

Zielinski traces the actual beginnings of the binary code for human communication back

to Sir Francis Bacon, who in the early seventeenth century was working on a universal

language by transcribing all the letters of the alphabet into multiple permutations of just

the two letters "a" and "b" (Zielinski 185). The road to the modern day electronic

computer shares these deceptively simple origins, passing through manifestations in

diverse fields of research and praxis. One of the most important applications of binary

code, for example, were the holes punched onto cards for either "up" or "down"

directions on the textile loom in the eighteenth century by French mechanics including

Joseph Marie Jacquard, introducing the idea of programmable machines. Charles

Babbage, of course, used programmable cards for his computer prototype in the

nineteenth century, the Analytical Engine—the same kind of punch cards that were

adopted for mechanical writing by the firm that became IBM (Manovich 24, Zielinski

236). Any direct influence of binary on Flusser's theories of cultural production as textile

weaving described in the preceding chapter would have to be only conjectural, although

his linguistic web weaving is not incompatible with his digital world creation, and as shown below, he does believe that the binary code arose out of the linear alphabet. In any case, the view that human culture was digital long before electronic computation is exactly Flusser's point.

Flusser himself draws on human culture's binary history to find particles and the intervals between them in pre-digital technology like his own typewriter which "stutters" or "goes 'click'" because the whole world stutters in a Democritean numeration or digitization ("Why Do Typewriters" 62). His theories reach much further back, however, into past forms of human communication to locate the beginnings of digitality's evolution from the written alphabet thousands of years ago. According to Flusser's history of code switches, the digital or zero-dimensional point code arose out of the one-dimensional line of the written alphabet when numbers were "freed" from the alphanumeric texts of science and art (*Die Schrift* 29). Connecting the aforementioned concepts of the wordless soup or ocean of possibilities and the spider webs of human culture, Flusser describes these alphanumeric texts as "nets" that strain information from the "amorphous broth," creating describable and countable things (*Die Schrift* 28). With the development of mathematics and the modern sciences, numbers were "lifted" out from the texts, Flusser writes, out of their strictly linear order, and with a simple calculator the world becomes a living, nonliving and social mosaic of interrelated and re-combinable calculi, genes, atomic particles and individual human minds (*Die Schrift* 29). Simplified to the binary code, Flusser explains, numbers can then be used by humans to realize the impossible or visualize the invisible, like fractal algorithms unfolding on a pixellated screen or human bodies altered to our own designs.

In Flusser's theory, the alphabet origins of the digital code reveal a latent digitality even in linear writing. Viewing letters, phonemes and morphemes as info-bits in their own right (the world's "oldest culturemes"), Flusser's information theory views writing itself as a process of creating new, improbable information out of language according to orthographic rules (*Die Schrift* 33). Part of the intersubjective cultural spider web, Flusser believes, the written text, a half-fabric waiting for its potential meanings to be realized by its reader-weavers, consists only of horizontal threads open to the vertical threads of meaning added by each individual reader. The reader, so Flusser, is to add meaning through critique: plucking particles out of the pile like chickens pecking at kernels of corn scattered in the sand. Seemingly different than his aforementioned dialogical process of reading as *simpatía* or harmonic co-vibrations with the author and his or her cultural environment, this critical reading process is scientific, a "rätselratendes Lesen," basically a conceptual rearranging of parts of linear sentences into a multidimensional thought-image or concept (*Die Schrift* 78). However, the writer of such a text first orders such concepts or images into lines to be later deciphered, Flusser believes, occupying the other end of the conversation in a digital version of dialogue. The consequence of the interchangeability of alphabet letters is then the precondition for the change from a line-dominant code to a digital one. On the digital side, it is one of the fundamental conditions for creative freedom in the sparser form of numbers, and finally binary. According to Flusser's vision, *Dichtung* as a modulation of phonemes, a game of multiple meanings, can in the future become the "opposite of imitation," not just reproducing situations already present, but creating entirely new models for how we experience and perceive the environment (*Die Schrift* 74). Instead of authoring complete,

intentionally designed texts, images and objects, the new *Dichter* will choose the best permutations from among the end states of a randomized program combining numbers and spontaneously realizing possibilities that emerge unpredictably.

Although Flusser breaks apart sentences into their component letters and numbers, it is clear that digital creativity in a telematic society depends on a two-step non-linearity. Not only must a line divide into its constituent points, but the points must reorganize into different formations, following different methods. As the world disintegrates into points, as it becomes calculable, Flusser writes, the points must be brought back together again, that is, they must be computed. Computation for Flusser means scattering, using chance to dictate the placement of points instead of planning out lines beforehand. Instead of measuring rods, the computing agent rather follows the wind (randomness, chaos) as it sweeps sand grains to dunes or blows plant seeds to fall and sprout where they may. Deftly equating sedentary agricultural societies with the linear written code, Flusser examines the building of cultures metaphorically as the sowing of seeds. Examining Western culture's linearity born from agricultural developments in the Roman Empire, Flusser describes how "setting" seeds into rows gives laws to nature, making it legible: *Gesetz*. It is difficult but necessary, he writes, to transcend that Roman farmer who is bound to our contemporary culture by the "zahlreichen Fäden" of our science, art, religion and politics ("Pünktlich" 9). Breaking out of the old cultural webs and spinning a new one in the gesture of *Streuen*, scattering seeds to create new information and cultures plays with the laws of linear cultures, programming them to follow the winds of chance, falling according to *Zufall*.

> Wohin ein einzelner Samen fällt, ist Zufall, weil bei seinem Fallen zahlreiche, (vielleicht zahllose), Gesetze gegen einander spielen, (das Gesetz des freien Falls,

die Gesetze der Dynamik, des Elektromagnetismus, der Meteorologie, (von anderen ganz zu schweigen). Der streuende Sämann ist legitimer als der setzende...und daher wird seine Ernte desto reicher. ("Pünktlich" 12)

Scattering is collaboration with nature for the sake of a richer harvest, zooming in on the borders between order and chaos (culture and nature, respectively) to the point where they bleed together in a gray zone below the level of linear culture. Going back to the amorphous broth of possibilities, deliberately playing with nature's laws instead of only fighting against them should yield realities heretofore unimaginable. It is important to remember from chapter one of this study that the freely creating mind in the telematic environment itself arose by those laws of nature that it tries to control, the creative ladle made out of soup, creating out of soup. Keeping with the agricultural metaphor, Flusser postulates in his last unfinished book *Menschwerdung* that the science of the future shall thus begin outside on the open field, knowing that the self, or the farmer's house, is nothing but another random phenomenon growing out of the dirt. The mind, Flusser writes, itself made of tiny grains scattered in electromagnetic fields, sows its cultural seeds—spins its webs—in an intentionally random gesture of scattering, letting a second nature grow out organically from the scattering hand. Instead of drawing lines separating order from chaos, a digital creativity will compute natural and cultural particles alike into new formations more appropriate to the changing telematic situation. "Es geht um eine schöpferische Denkart: nicht mehr weiter im Feld Furchen graben, und damit immer leerere Intervalle öffnen, sondern im Gegenteil aus dem gähnenden Nichts positive Verhältnisse, (Komputationen), zu schöpfen" ("Pünktlich" 22).

Fragmentation, nonlinearity, a paradoxical interconnectivity of isolated particles—some of the most basic aspects of digitality underlying Flusser's understanding

of matter, energy, space and time in the telematic age have long natural and cultural histories predating the so-called digital age of electronic computers, and may likewise be found in non-digital cultural products of this digital age. Concrete examples in Flusser's work are few, but I suggest artist Franz Ackermann's 1994-2002 installation *Condominium* presents an abstracted model of a city that creates an almost Flusserian experience for its visitors, one which is strikingly digital and interconnected despite its analogue materials. Tall rectangular wall panels and a glass tower are covered by circular photographs and circular holes, respectively, resembling skyscrapers covered in windows around which visitors can physically walk. In this model of the city, times and places have been broken up and repositioned in a disorienting chaos of unordered photographic fragments spanning altogether about a century of Berlin's past, as well as images of planned constructions, some of which were never realized. Mixing pasts and futures, dispersing any narrative chronology, Ackermann further disorients the viewer by avoiding any images with an eye-level perspective—the city scenes cannot be entered, no road signs point toward a future. Maps to which a disoriented tourist would normally turn fill up the glass tower, crumpled squares of fabric protruding teasingly from the fenestration. The cartographic fragments of different Berlin maps serve merely to further overwhelm and disorient the viewer, remnants of order chaotically juxtaposed. The fragments are all different, but so similar that they seem to repeat and reflect themselves in each other, creating a patterned multidimensional webbing of reflected spatial and temporal trajectories through which to walk.

Flusser would, I suggest, console the confused viewer of *Condominium* with his belief that the disintegration of linear space-time opens the future to new, free, creative

re-orientations. The past and the future are both open, and Berlin, city of cuts and bandages, connections and fragmentation, division and reunification, seems not to crumble once its seams have worn thin. Rather, the connections, interactions and reflections of places and times throughout *Condominium*'s overlapping circuitry constantly morph and fluctuate with the viewer's movement through the fragmented city. The viewer's gaze ceaselessly reflects off of one impenetrable photographic fragment and onto the next; around and in-between these movements, the images themselves are reflected inside and off of the glass tower at many angles. Even without having ever read one word by Flusser, however, the visitor walking through *Condominium* might perceive the sensation that this new city model consists only of links without endpoints, fluctuating relationships between the tiny window "particles." The viewer's gaze does indeed travel without rest. The spaces and times of the installation's elements have their own movement and duration, as fractions of histories, repeated layers and reflections. Without endpoints to the linkages, there are only changing patterns, open loops and morphing relationships: new maps for our digitized, disorienting surroundings supporting a Flusserian hope for a free telematic future.

Pixel Art

In Flusser's sense, the future's potential for new world creation expands with the predominance of digital technology, where computers take over the task of fragmenting and repositioning bits of reality into new formations more efficiently than ever before— humans will have no more work, only free time to playfully create, or else suffer boredom ("On Science" 371). Coaxing unexpected combinations of coded fragments to emerge from randomized programs requires a light touch from the *Dichter* or

programmer—artfully, electronically, randomly scattering the seeds of reality to fall where they may, in Flusser's terms—finding ways to employ chaos in construction. The transition to the digital code requires different tools for the same methods, recoding analogue processes into interchangeable "zero-dimensional" points and the gaps between them. The possibilities Flusser sees inherent in the digital medium to create never-before-seen combinations of particles surface not only at the micro-level of zeros and ones but further up at higher levels in which whole molecules, images, texts, objects and fragments thereof can be broken apart and rearranged randomly, intentionally or both. The translational process defined as "digitalization—understood as the technological process that reduces the text to something that can be easily fragmented, handled, linked and distributed—[and] what allows networking, multimedia, collaborative and interactive communication" applies to texts, images and objects alike, at different scales (Scolari 946). Lev Manovich's five principles of new media explain in depth the digital tools available for alternative world creation. First, because the media exist as numerical representations, just like Flusser emphasizes, their digital code can be described mathematically and thus manipulated algorithmically. Second, the same digital structure characterizes media at many different scales: "a new media object consists of independent parts, each of which consists of smaller independent parts, and so on, down to the level of the smallest 'atoms'—pixels, 3-D points, or text characters" (Manovich 31). These parts remain distinct and can be deleted or substituted by different parts of equal size and shape. Third, this allows for an automation of operations which allows media users to manipulate digital objects on the surface without having to work on the underlying algorithms or code which make up the object. Fourth, this also allows for

variability of a media object, the fact that it has many other possible versions and can be changed to another of these at any point in time, eliminating the notion of a single, original version. Fifth, the new media are always part computer logic and part cultural conventions, the two layers in direct feedback with each other, in a cycle of mutual influence. While all of these aspects of digitality are promising for Flusser's world creation, some have dangerous consequences, as seen below.

Flusser's call for a conscientious approach to recreating our world as examined previously applies also in the age of digital technology. His fear of the consequences of powerful automation making it not only easier to create, but easier not to think, is noticeable throughout his work, specifically *Für eine Philosophie der Fotografie*. The responsibility to evaluate each step in the synthesizing process moves from artist to apparatus, the latter being Flusser's special term for both technological machines and the social institutions which create and promote them. The economic apparatus, for example, "programs" the scientific apparatus, which programs technological equipment, media, and so forth, social programming hardly different than software programming. The levels of programming are countless and sometimes imperceptible, but increasingly rigid the more automatic they become. Apparatuses, especially technological ones, do the work for humans, but take over the decision making process; they are "simplifizierte Simulationen von menschlichen Denkprozessen, die, eben weil sie so stur sind, menschliche Entscheidungen überflüssig und funktionell machen" (*Philosophie* 67). To limit the amount of "help" from apparatuses, that is, to maintain a satisfying degree of human freedom in the creative decision-making process while utilizing technology to better realize possible worlds, Flusser urges that all human beings accept their place in a

programmed world while always remaining engaged in disrupting the programs, forever playing against the machine. Without aiming to win or lose, the give and take between creative humans and programmed apparatuses should exist in a dynamic feedback loop, machine systems open to anti-mechanistic chaos, ultimately absorbing human unpredictabilities back into the programs and humans again fighting back. It is a highly functional system composed of complimentary yet opposite forces, and with the right balance, can serve to create whole new environments mixing culture and nature, art and science, metaphor and machine—helping free humans deliberately weave a second nature by reassembling information bits.

Digital creation in two dimensions has achieved levels of efficiency and density of particle condensation, to use his terms, that Flusser only imagined. On the plane surface of the computer screen, new second natures can already be created that never before existed. Digital images can appear at higher resolution than analogue photographs, their pixels dense enough to resemble snapshots of a world that could be real but never existed outside the image. A Flusserian observer, however, would first remember (as explained in the first chapter of this study) that digital photographs as "technical images" are no closer to an original nature than analogue photographs, despite their superlative realness, being rather one step further away from the trees and clouds of tangible life as their analogue counterparts. As part of the translation process recoding the perceivable world from four into three, two, one, and finally zero dimensions, linear science based on alphabetic codes created analogue photographs just as digital computer codes created pixelled images. The almost immaterial images fleeting across screens are then the furthest level of abstraction from the physical world, lacking all their dimensions as

clusters of points. Their enhanced realness or naturalness is as deceptive as older

products of linear and surface codes, all of which are abstracted from the idea of an

original nature. Flusserian viewers can lament humans' ever-increasing distance from the

four-dimensional code of experiencing the world, or they can see in digital technology an

increased freedom to move forward toward a nature-culture hybrid environment, the

potential to realize heretofore unthinkable possible worlds and create a deliberate second

nature from zero back up to four dimensions.

A mountain landscape in Joan Fontcuberta's digital photograph *Orogenesis:*

Gainsborough (2004) illustrates Flusser's struggle against the apparatus and captures

humans' confused relationship to nature precisely. Like Ackermann's *Condominium*,

Gainsborough provides no rest for the embodied eye. Treacherous mountain peaks

disappear into a shallow ocean viewed as if from an aerial perspective. This could at first

glance be a snapshot from anywhere on the globe, but something about it seems wrong.

There is no life, no foliage, birds, fish, lichens, and no history—the rocky islands are too

new, unworn. Without the small wisps of clouds fading out of the frame, these rocks

could be any size, even a few inches tall in a puddle, and still they are unapproachable.

Shadows from some lower-right-hand sun make sense, but the still water reflects none of

the light. It is a trick. This is not, never was water: it engulfs, and it is transparent, but it

does not reflect. This impossible landscape has no nature. Fontcuberta himself

introduces his images in speaking of this emptiness of his landscapes: "Landscape is the

expression of *place*; place as inhabited space…space appropriated by consciousness.

…How are we to represent the place when what prevails is the nonplace: when void and

dislocation come to occupy the territory? The crisis of the landscape today is bound up

with a sense of the loss of natural space" (Fontcuberta 5). Referring to nature sacrificed to strip-malls, factories and highways, this perceived loss of nature is caused by the machine of human technological development. If his landscapes represent the absence of natural space, they do so technologically, by representing layer upon layer of additional representations until the referent cannot be recognized. These are landscapes of landscapes, successive translations into different codes moving further and further away from some lost nature: Flusser's technical images.

Fontcuberta uses computer programs originally developed for military or scientific use to create "three-dimensional" landscapes out of flat two-dimensional maps in ways unintended by the programs: instead of maps, he interprets other landscapes. *Gainsborough*, for instance, is so named because he fed Thomas Gainsborough's 1758 oil painting of a "natural" forest glen in *Cornard Wood, near Sudbury, Suffolk* into the program which read it and encoded it into the program's own (quite limited) language, translating leafy tree branches and dirt paths into inorganic rock formations and oceanic puddles of uncertain scale. Fontcuberta calls the resulting images "products of a deception," in that the program "has been *forced* into a 'transvestism' of signs that ask to be understood, and are likely to be read, as an illuminating gesture of subversion" (6). Thus it happens that a simple absence of reflection in the water becomes a deliberate self-reflexivity in *Gainsborough*, calling forth the gap between the virtual and the real, between autumnal trees, paintbrush strokes and lifeless digital projections, revealing the loss of the natural and "that every image is a trap, but also that only fiction is now possible, and that we live embedded inside it" (Fontcuberta 6).

Seeing both nature and landscape as fiction is to see in these deceptive landscapes the loss of the experience of physical space through many levels of remove between the human and nature, a loss normally hidden in the technical images Flusser describes. The levels of abstraction in Fontcuberta's landscape are extended from those already present in traditional landscape images, as the physical world translates not only into the human concept of nature as landscape, followed by its translation through human movement and tactile materials into a painted image, but now is translated again into an even more abstracted—reorganized or recoded—digital landscape. The final code of translation here is the binary computer code, which visualizes mathematical equations producing the fractal shapes which are the tools of Fontcuberta's orogenetic software programs—the algorithms dictate surface folding that mimics mountain formation. Fractals are the visualization of equations involving chance combined with patterns which produce self-similarity regardless of scale, meaning that "the degree of their irregularity and/or fragmentation is identical at all scales" from the large to the infinitely small (Mandelbrot 1). Here, the language of the fractal is the conceptual-mathematical step between the painted and digital landscapes; it is a hidden level of remove, bringing the digital landscape even further from a four-dimensional origin.

But there is more to the abstraction of fractals than just a computational tool, as illustrated in the following example. Artist Arlene Stamp produced a fractal image analogous to the fractal branching pattern of a tree simply by plotting out consecutive binary numbers on a grid, black squares for zero, white for one. As the structure of the binary code formed a fractal on its own, she "could see the inextricable link between pictures of fractals generated by computers and simple binary numbers, which underlie

the structure of the computer itself" (Peterson 90). The fractal as binary landscape can thus be seen as both tool and medium in the formation of these digital landscapes, as fractal forms become visible in the resulting images themselves. Surprisingly, the inaccessible world of *Gainsborough*'s rocky islands is itself reminiscent of a mathematical pattern called fractal dust, an image created when a geometrical shape is randomly fragmented piece-by-piece according to a particular fractal dimension. The characteristic of fractals that they involve a degree of self-similarity regardless of scale is a quality recognizable in the rock formations of Fontcuberta's fictional landscape. The bits of clouds—themselves formed fractally—are not enough to hide this uncertainty of scale. The deception in this image is cleverly executed: fractal patterns are found almost everywhere in the physical world, from tree-branching to mountain cleavage to coastlines to clouds, and thus also found in the landscapes both before and after the digital translation (in both Gainsborough's and Fontcuberta's images), tempting the observer to see nature in the unreal image. On the contrary, the digital landscape is the farthest step of remove from nature as we have traditionally conceived of it, and which is now fictional itself. The digital landscapes are simply "sets of numerical data posing as photographs" (Batchen 9). The work of the fractal here is technological deception.

Flusser's critique of the deceptive technical image makes this more explicit. The apparatus, in this case the camera or computer, creates technical images as it has been programmed to do so by humans, but supersedes human intention by using the unwitting humans again simply to further its own program. The human observer is deceived into thinking the technical image is closer to reality or the physical world, when in fact the image is farther away from nature than ever before, due to the mathematical nature of the

apparatus. The program reorganizes images into its own code instead of copying them from nature; it is too late to insert human intention into the process. "There is no place for human freedom," Flusser warns, "within the area of automated, programmed and programming apparatuses" (*Philosophy* 81). To realize this fact is nevertheless the very means to make possible a freedom which is "the strategy of making chance and necessity subordinate to human intention" (*Philosophy* 80). Recognizing the programmed structure of the automated game of chance, the human artist must try to deliberately bend the rules, opening up the mechanistic system to highly improbable configurations of parts. The results would be temporary before they too are reabsorbed into the program, but the process of playing is the only goal. In this way, Fontcuberta exercises his freedom by subverting the map-reading computer program intentionally making fun of the software's limited internal logic. In fact, he does this also in his earlier analogue photographs of recombined plant life, making deceptive images which appear at first to be natural— piecing together different plant parts into alien plantlike forms and photographing the result. Flusser himself introduces Fontcuberta's photo-book *Herbarium*, describing the photographs of manipulated plants as a critique of the "blind" randomness of the internal laws of natural selection. "Once we have discovered this stupid game of chance…we may deliberately interfere with it in order to provoke desirable mutations," Flusser writes, just like the work of agriculturists and plant geneticists, although Fontcuberta's non-useful manipulations make fun of science, technology and nature out of a "tragic disappointment" with it (*Herbarium*, n.p.).

Clearly, this struggle for the authenticity of human intention effectively equates the programmed apparatus with the chance laws of nature, to the point of a conflation of

nature and machine. Fontcuberta's plants are independent of the laws of biological

evolution, his landscapes independent of the laws of geological evolution. Moreover,

they both subvert the laws of the technological apparatus. All these systems involve

patterns formed by internal laws mixed with chance, the fractal is one characteristic

among many others that exemplifies this ubiquitous paradox of random order. Nature

becomes a randomized version of a machine by virtue of its automatic program.

Elizabeth Neswald writes of Flusser's philosophy, that "die maschinelle Funktion ist zum

Wesen der Natur geworden," quoting him on his concept of a universe that functions

simply according to the laws of chance as "ein Automat. Es hat ein Programm…und das

Programm wird ablaufen, bis es erfüllt ist, und es gibt nichts idiotischeres als das"

(Neswald 57). Just as blind nature becomes blind machine, "so erscheinen Maschinen als

natürlich," Neswald decides (57-8). The equation is much too simple, however. Nature's

automation runs on randomness in contrast to deterministic machines designed to

eliminate all chance events, and understanding nature and technology as one functional

unit means a second nature neither fully random nor deterministic. More an open system,

metaphor machine or dissipative structure as described previously, Flusser's second

nature allows order to emerge out of chaos in a delicate balance of blind chance, machine

logic and human unpredictability.

Free human creativity, following Flusser's logic, would then entail the deliberate,

unpredictable or "human" application and extension of nature's laws of particle collision

by means of digital technology. The very binary code of computation that abstracts the

human from the traditional concept of nature can, in fractal form and otherwise, model

new structures of experiencing the world, creating new perceptions. Paul Virilio, for

instance, ascribes the current loss of physical space to the sphere of digitally-produced

images of mass-media and satellite surveillance which form an outer bubble that closes in

on us, erasing spatio-temporal dimensions at an ever-increasing rate. The virtual texture

of this constricting bubble we experience as a fractal surface: "Suddenly," he writes, "we

possess this ease of passing without transition or delay from the perception of the

infinitesimally small to the perception of the infinitely large, from the immediate

proximity of the visible to the visibility of all that lingers beyond our field of vision"

(Virilio 32). Because digital images can now come to us from around the globe at an

instant, our location in physical space dissolves. We travel through virtual space at will

in the network of pixels, nomadic in Flusser's eyes—which creates the new condition that

the nomadic "Lebensrhythmus...muß in fraktalen Algorithmen ausgedrückt werden"

(Flusser, *Freiheit* 61). As mentioned above, he believes that the wind is all that is left for

us as nomads to orient ourselves with, the wind that calculates the physical world,

grinding it up into pixels and computing them into new structures. Leaving the physical

experience of earth and wind step by step for an experience structured by computer

codes, the telematic human retains the "meteorologische, 'selbstähnliche', fraktale

Tatsache" of the workings of a digital world (Flusser, *Freiheit* 61).

Bio Art

The culmination of our quest for knowledge and technical mastery of processes

and tools for digital creation is the ability to reshape what comes through our pores so

that it may give us meaning in an absurd world. Moving up the dimensional spectrum

from points to lines to images to objects, human creativity in Flusser's telematic society

knows only technological bounds. The trajectory toward increasingly real creations is, in

Flusser's view, the chance for humans to artistically, scientifically find freedom by

playing with chance and entropy and the complex order that can emerge in the process.

The secret to be gleaned from his strange metaphorical philosophy is that a rich,

meaningful second nature is brought about with a light touch indeed, a fragile balance of

forces instead of a battle to the death between culture and nature. Ultimately it is through

experimental play with nature's laws that inextricably blends culture and nature at the

particle level, collaborating with nature so that we may ultimately recreate ourselves as

both natural and cultural beings. Flusser's concern over the dangers of losing to the blind

automation of entropy and cultural programming is paralleled by his belief that humans'

creative freedom is limited only by our imagination. Achieving immortality and lasting

significance is, if not impossible, fully unimportant. The achievable goal is to keep

playing. Why not?

> Why is it that dogs aren't yet blue with red spots, and that horses don't yet radiate
> phosphorescent colors over the nocturnal meadows of the land? … Not only do
> we have mountains of butter and ham, rivers of milk and wine, but we can now
> make artificial living beings, living artworks. If we chose, these developments
> could be brought together, and farming could be transferred from peasants, a class
> almost defunct anyway, to artists, who breed like rabbits, and don't get enough to
> eat. ("On Science" 371)

Imagining a film showing the entire course of human history, Flusser watches

complex patterns emerge over the globe, first nomadic peoples following migrating herds

over the steppe, then reorganizing around campfires in small forest clearings, then fields

of grain and animal pastures between cities. The film continues past Flusser's present day

to show him "a continent-sized Disneyland full of people working very short weeks

because of automation, and trying desperately to amuse themselves so as not to die of

boredom" ("On Science" 371). Flusser's Disneyland of the telematic future, however,

looks surprisingly like the hellish paradise of the *Vampyroteuthis infernalis*, as Flusser states directly that the other-worldly colors and shapes of the ocean floor may one day be programmable by molecular biology artists all over Earth's surface. In a simple "transfer of genetic information," Earth's creatures will be modified, bred or otherwise engineered to resemble the "fields and forests of plantlike creatures whose red, blue, and yellow tentacles sway with the currents, gigantic rainbow-colored snails trailing through the scenery, and swarms of silvery, gold, and violet fish overflying it" ("On Science" 372). One day being able to "program" such symbiotic oddities that would normally be a once-in-a-millenium random mutation or a "consequence of a complex evolutional chain of feedbacks and adjustments," the genetic artist would be able to "compose an enormous color symphony, evolving spontaneously through endless variations (mutations) in which the color of every living organism will complement the colors of every other organism, and be mirrored by them" ("On Science" 372). An environment no longer traditionally natural, Flusser counters his objectors, should not be a concern because humans turned their environment artificial from the earliest days of forest clearing and crop planting. Humans have always manipulated the life around them in order to survive. Even once machines take over the work for survival, however, the rise in boredom alone should be able to justify "art's role in the immediate future" ("On Science" 372).

Always with one eye on hell and the other on heaven, Flusser's vision is no euphoria of bioinformatics that promotes "a dangerously reductive analogy between discrete binary data and the more complex, environment-related field of genetics" (Kac 1). Science unchecked and programmed by the powerful elite can objectify humans and other living things leading to gene patenting, genetic discrimination and damaging

156

genetically-modified organisms. Flusser himself was already aware of the dark side of human nature, and the many controversies that spring up around biotechnology are not substantially different from the dangers of objectifying and controlling the masses through technology that Flusser warns against in *Vampyroteuthis infernalis* or *Für eine Philosophie der Fotografie*. The energy and optimism exuded by Flusser's philosophy always takes this threat as its context, a hopeful creative vision back-lit by the blinding abysses of entropy, blind chance and automatic programs. Play against the machine, Flusser reasons, and the game is already won. Meaning out of *Bodenlosigkeit* is made by creating as freely as possible, which means enlisting the powers of nature, technology and humans' natural artistic creativity. Bio art expands this to three or more dimensions, the manipulation of "biological materials at discrete levels (e.g., individual cells, proteins, genes, nucleotides) and the actual creation of new life" (Kac 12). In this, subjects are created instead of objects, living autonomous beings are "elements of a true art of evolution" (Kac 14). More than objects, living art interacts with environment and artist alike; like any art of a digital nature, bio art transforms isolated specks into a connected ecosystem, only all the more evident in vascular masses of organ tissue, petals and leaves, bone and skin. "Bio art emphasizes the dialogical and relational (e.g., cross-pollination, social intercourse, cell interaction, interspecies communication) as much as the material and formal qualities of art (the shape of frogs, the color of flowers, bioluminescence, the patterns on butterfly wings)" (Kac 19-20). Emergent complexities evolve as the bio artist nudges binary and biological particles to bend their own programming into improbable states, reacting to each other in unpredictable ways.

> Artists working with the tools of the biotechnology age grapple with the
> complexity of life, that is, the interaction among genetics, organism and

environment. They resist biological determinism and reductionism, and they demonstrate the fragility of the objective edifice of science. They also invent new entities and new relationships never seen before" (Kac 24).

Flusser's intuition is always on an ecological level; he envisions whole ecosystems and worlds, whole fabrics, oceans and webs of realities that as a whole make up a second nature full of human creativity, blind chance and entropy combined. In the aforementioned telematic society where only relations between things and people are concrete, selves and objects do not exist without the other selves and objects in their environment. The new realities Flusser sees possible for the telematic future are not at all built from those tiny points, pixels, proteins or even people, but from the connections between them. Flusser's fundamental notion of the field of relations between immaterial nodes can be applied to the various overlapping realms of human creativity. Barbara Stafford's description of this "expanding creative metaverse" links the "post-anthropic biology" of cells instead of selves with the "new aesthetic media" of back-linked weblogs and electronic literature:

> In both cases, we are confronted with an exitless maze of operations that are unpredictable, discrete, nonlinear, and ever-responsive to the back and forth clicking of multiple users. Pattern—whether on the monitor or in the petrie dish— is emergent, deriving from an elastic database from which mutable excerpts or fragments are selected to interact with a limited or vast number of options. (Stafford 377)

On computer screens as in cell culture labs, emergent principles as introduced in the previous chapter are fundamental to the organic structures that form from the interaction of tiny particles. Flusser's metaphors translating sand grains into pixels and wind turbulence into algorithms highlight the digital structures present in both nature and computer technology that create an environment conducive to the spontaneous emergence of new order. All of life can be defined in one sense as a shaky balance of chaotic forces,

158

one which Flusser understands to consist of particles but which cannot exist without the context of relationships connecting these particles into a whole larger than its parts. The science is now just barely catching up: "Preserving a fragile ballet of randomness—made up of little routines and a swirl of minutiae—is the opposite of the genetic logic of the speck. … the genetic perspective [cloning, genetic splicing, etc.] interprets life as a synthetic, detachable, arbitrary, and ahistorical ordering of reshuffleable components" (Stafford 381). Thus free human creativity, while digital in nature, must ultimately strive to create not objects, but whole worlds, including intersubjective human environments suggestive of Flusser's anthill superorganisms. In other words, "each individual is a complex ecology of interacting agents—heredity, selection, development, cultural practices and values—not a mere aggregate of them … a complexly fracturing environment" (Stafford 382). I believe Flusser breaks down nature, culture and technology alike into a common digitality only for the purposes of understanding how the parts may reconnect by means both natural and technological, including spontaneous, fractal, non-deterministic emergence.

Biological artistry as a crucial step towards realizing Flusser's vision for human creative freedom requires the entire ecosystem of our second nature, in which case new creations are of course free of the same strict nature-culture divisions as the artistic media. Eduardo Kac's 2000 transgenic bunny Alba can glow in the dark, in the 1980s George Gessert can crossbreed himself with an iris, Alexander Fleming can paint a human portrait as early as 1933 with pigmented bacteria grown in a petri dish, and again in 2000 Oron Catts and Ionat Zurr can culture human tissue on a polymer scaffolding

159

outside of the supporting body.[10] Bio art need not even restrict itself to the living; it conjures up chimeras not fully alive in the traditional sense. In a parallel to Porush's soft machine, a complex system both technology and anti-mechanistic chaos, Louis Bec, illustrator and collaborator with Flusser for the *Vampyroteuthis*, focuses on semi-living animal-technological hybrids, especially neuron-silicon chip fusions that combine deterministic machines with living, learning beings. "Mediation between the living and the technological machine … becomes a world in and of itself that gives rise to an aesthetic of complex systems. … This aesthetic takes into account the significant emergence of coherence and the robustness of the integrated functioning of the living and the constructed machine" (Bec 89-90). Bec and other bio artists are able to put Flusser's ideas into practice, rupturing whole animal and machine entities, mixing and recombining them on the microscopic level.

Whether transgenic bunnies or flowers, bacteria paintings or wet clumps of tissue, genetically mutated organisms, groupings of individual cells or semi-living hybrids, the trajectories of bio art all lead to a future Flusser could only dream of. The wildest part about his hypothetical visions is that they are already materializing. Perhaps all these artistic/scientific strategies—installations, images, animals—combined will gradually intermingle and overlap to weave piece by piece, pixel or gene an interconnected second nature that does not objectify humans and other living things, but rather spontaneously generates itself from the dynamic interactions between blind life, technology, choice and chance. These strategies should ultimately create an intersubjective network of relations

---

10 Presented in Kac, Eduardo. Ed. *Signs of Life: Bio Art and Beyond*. Cambridge MA: MIT, 2007.

beyond humans that in turn enriches human life as much as possible, all in the atmosphere of absurdity, of *Bodenlosigkeit*. In the last existing chapter of what was to be his unfinished last book *Menschwerdung*, Flusser insists that our "religious" belief in science will have to change. In the future science will also be art, he writes, and objective knowledge will be impossible. Space will be filled with intersecting relations, dimensions will be measured according to our level of interest instead of distance, and time will be no diachronic flow toward the future, but a "symphonic" ocean of possibilities approaching us "algorithmically" from all sides. Progress will not be discovery, but intersubjective dialogue, and encountering others will mean overlapping your relational net with theirs. What is left to believe in after an awareness of *Bodenlosigkeit*, Flusser offers, is dialogue with another, with others, a concrete overcoming of death where we survive in their memories. This "new way of being human" is to live a rich life and enjoy it, recreating our connections, environment and ourselves to our liking, solving problems and helping others in dialogue. Our task through art and science is ultimately "gemeinsam mit anderen dem Leben einen Sinn zu geben" ("Was man wollen kann" 24).

Works Cited

Batchen, Geoffrey. "photography by the numbers." *landscapes without memory*. NY: Aperture, 2005.

Bateson, Gregory. *Mind and Nature: A Necessary Unity.* New York: Dutton, 1979.

Bec, Louis. "Institut Scientifique de Recherche Paranaturaliste Leçon d'Epistemologie Fabulatoire No 12: Vilém Flusser 1920/1991." *Flusser Studies.* May 2007. 4, 1-12. flusserstudies.net.

---. "Life Art." *Signs of Life: Bio Art and Beyond*. Ed. Eduardo Kac. Cambridge MA: MIT, 2007. 83-92.

---. "Vampyroteuthis infernalis: Postscriptum." *Flusser Studies.* May 2007. 4, 1-8. flusserstudies.net.

Botz-Bornstein, Thorsten. "Genes, Memes, and the Chinese Concept of Wen: Toward a Nature/Culture Model of Genetics." *Philosophy East & West*. U of Hawai'i P, April 2010. 60, 2. 167-186.

Bozzi, Paola. "Rhapsody in Blue. Vilém Flusser und der *Vampyroteuthis Infernalis*." *Flusser Studies.* November 2005. 1, 1-20. flusserstudies.net.

Buck-Morss, Susan. *Dialectics of Seeing: Walter Benjamin and the Arcades Project*. Cambridge, MA: The MIT Press, 1989.

Cardoso, Rafael. "Devil may care: Flusser's journey into exile and beyond reason." *Flusser Studies*. November 2008. 7, 1-13. flusserstudies.net.

Dotzler, Bernhard J. "Wissen in Geschichten. Zur wechselseitigen Erhellung von Literatur, Medien und Wissenschaft." *Berichte zur Wissenschaftsgeschichte*. Weinheim: Wiley-VCH, 2009. 32, 319-328.

Elm, Theo und Hans H. Hiebel, Ed. *Medien und Maschinen: Literatur im technischen Zeitalter.* Freiburg: Rombach, 1991.

Felinto, Erick. "*Vampyroteuthis*: a Segunda Natureza do Cinema. A 'Matéria' do Filme e o Corpo do Espectador." *Flusser Studies*. November 2010. 10, 1-22. flusserstudies.net.

Flusser, Vilém. "About a house of the color." English version of essay for *Casa da Cor*. Property of Vilém Flusser Archiv Berlin. 1988. 1-6.

---. *A História do Diabo*. São Paulo: Annablume, 2008.

---. *Bodenlos: Eine philosophische Autobiographie*. Frankfurt a. M.: Fischer, 1999.

---. "Concreto-abstrato." *Da Religiosidade: A literatura e o senso de realidade.* São Paulo: Escrituras Editora, 2002. 147-154.

---. "Correspondence with Milton Vargas and Dora Ferreira da Silva: Excerpts from 1981-1990." *Vampyroteuthis infernalis*. Ed. and Trans. Rodrigo Maltez Novaes. New York: Atropos, 2011. 129-158.

---. "Da dúvida." *Da Religiosidade: A literatura e o senso de realidade.* São Paulo: Escrituras Editora, 2002. 47-61.

---. "Das Ende der Tyrannei." *Du.* Vol. 11. Zürich, 1991. 52-55.

---. *Die Schrift: Hat Schreiben Zukunft?* Göttingen: European Photography, 1987.

---. *Dinge und Undinge*. München: Carl Hanser Verlag, 1993.

---. "Do poder da língua portuguesa." *Da Religiosidade: A literatura e o senso de realidade.* São Paulo: Escrituras Editora, 2002. 161-172.

---. "Esperando por Kafka." *Da Religiosidade: A literatura e o senso de realidade.* São Paulo: Escrituras Editora, 2002. 69-82.

---. *Für eine Philosophie der Fotografie*. Göttingen: European Photography, 1994.

---. "Introduction." in: Joan Fontcuberta. *Herbarium.* Göttingen: European Photography, 1985.

---. *Kommunikologie*. Frankfurt am Main: Fischer Verlag, 2007.

---. *Língua e Realidade*. São Paulo: Annablume, 2007.

---. "On Memory (Electronic or Otherwise)." *Leonardo*. 23, 4. Great Britain: Pergamon, 1990. 397-399.

---. "On Science." *Signs of Life: Bio Art and Beyond*. Ed. Eduardo Kac. Cambridge MA: MIT, 2007. 371-372.

---. "On the End of History." *Writings.* Minneapolis: U of Minn Press, 2002. 143-149.

---. "On the Importance of Art for Survival." Property of Flusser Archiv Berlin. Publication unknown, n.d. 1-4, 7-12.

---. "Pünktlich." *Flusser Studies*. November 2011. 12, 1-22. flusserstudies.net.

---. "The City as Wave-Trough in the Image-Flood." Trans. Phil Gochenour. *Critical Inquiry.* 31,2. Chicago: U Chicago P, Winter 2005. 320-328.

---. *Towards a Philosophy of Photography.* Trans. Anthony Mathews. London: Reaktion, 2007.

---. *Vampyroteuthis infernalis. Eine Abhandlung samt Befund des Institut Scientifique de Recherche Paranaturaliste*, with Louis Bec. Göttingen: European Photography, 2002.

---. *Vogelflüge. Essays zu Natur und Kultur*. München: Carl Hanser Verlag, 2000.

---. *Vom Zweifel*. Berlin: European Photography, 2006.

---. *Von der Freiheit des Migranten: Einsprüche gegen den Nationalismus*. Bensheim: Bollman Verlag, 1994.

–. "Was man wollen kann." *Flusser Studies.* November 2011. 12, 1-25. flusserstudies.net.

---. "Why Do Typewriters Go 'Click'?" *The Shape of Things: A Philosophy of Design.* Ed. Andreas Ströhl. Trans. Anthony Mathews. London: Reaktion, 1999.

---. "Wondering About Science." *Artforum International*. Vol. 27. New York, 1989. 104-107.

Fontcuberta, Joan. "landscapes of landscapes, or art as map." *landscapes without memory*. NY: Aperture, 2005.

Gochenour, Phil. Introduction to translation of Vilém Flusser, "The City as Wave-Trough in the Image-Flood." *Critical Inquiry.* Winter 2005. 31,2. 320-328.

Goodbody, Axel. *Nature, Technology and Cultural Change in Twentieth-Century German Literature*: *The Challenge of Ecocriticism.* New York: Palgrave Macmillan, 2007.

Guldin, Rainer. "'Acheronta movebo': On the Diabolical Principle in Vilém Flusser's Writing." *Flusser Studies.* May 2011. 11, 1-13. flusserstudies.net.

---. *Philosophieren zwischen den Sprachen. Vilém Flussers Werk*. München: Wilhelm Fink Verlag, 2005.

Hansen, Mark, Marie-Louise Angerer. "Delimitation of Life: Affective Bodies and Biomedia." Moderated by Jens Hauser. Keynote Conversation of *Transmediale, Body: Response*. Berlin, Germany 6 February 2011.

Johnson, Steven. *Emergence: The Connected Lives of Ants, Brains, Cities and Software.* London: Penguin, 2002.

Kac, Eduardo. "Art that Looks You in the Eye: Hybrids, Clones, Mutants, Synthetics, and Transgenics." *Signs of Life: Bio Art and Beyond*. Ed. Eduardo Kac. Cambridge MA: MIT, 2007. 1-27.

Krause, Gustavo Bernardo. "Prefácio." In Vilém Flusser. *Língua e Realidade*. São Paulo: Annablume, 2007. 9-20.

Manovich, Lev. *The Language of New Media.* Cambridge, MA: MIT, 2001.

Mandelbrot, Benoît B. *The Fractal Geometry of Nature.* NY: W. H. Freeman, 1983.

Moles, Abraham. "Forward." *Vampyroteuthis infernalis*. Ed. and Trans. Rodrigo Maltez Novaes. New York: Atropos, 2011. 19-20.

Novaes, Rodrigo Maltez. "Editor's Preface." *Vampyroteuthis infernalis*. Ed. and Trans. Rodrigo Maltez Novaes. New York: Atropos, 2011. 11-14.

Neswald, Elizabeth. *Medien-Theologie: Das Werk Vilém Flussers.* Köln: Böhlau, 1998.

Nietzsche, Friedrich. "Über Wahrheit und Lüge im außermoralischen Sinne (1873)." *Digitale Kritische Gesamtausgabe von Nietzsches Werken und Briefen (eKGWB).* Digital corrected version of Colli and Montinari. *Friedrich Nietzsche, Werke. Kritische Gesamtausgabe.* Berlin/New York: de Gruyter, 1967–. Nietzsche Source Scholary Editions. Web. 28 October 2011. 1-2.

Peterson, Ivars. *Fragments of Infinity: A Kaleidoscope of Math and Art*. NY: John Wiley & Sons, 2001.

Porush, David. "Eudoxical Discourse: A Post-Postmodern Model for the Relations between Science and Literature." *Modern Language Studies.* Autumn, 1990. 20, 4. 40-64.

---. "Literature as Dissipative Structure: Prigogine's Theory and the Postmodern 'Chaos Machine.'" *Literature and Technology.* Ed. Mark L. Greenberg and Lance Schachterle. London: Associated U P, 1992. 275-306.

---. *The Soft Machine: Cybernetic Fiction.* New York: Methuen, 1985.

Scolari, Carlos Alberto. "Mapping Conversations about New Media: the Theoretical Field of Digital Communication." *New Media and Society*. September, 2009. 11, 6. 943-964.

Stafford, Barbara Maria. "From Genetic Perspective to Biohistory: The Ambiguities of Looking Down, Across and Beyond." *Signs of Life: Bio Art and Beyond*. Ed. Eduardo Kac. Cambridge MA: MIT, 2007. 373-386.

Virilio, Paul. *Lost Dimension.* Trans. Daniel Moshenberg. Semiotext(e), 1991.

Zielinski, Siegfried. *Deep Time of the Media: Toward an Archaeology of Hearing and Seeing by Technical Means.* Trans. Gloria Custance. Cambridge, MA: MIT, 2006.