

# **Worldview-Revisions Weltbildhaus-Umbauten**

An Essay on Epistemology  
The Fundamental Assumptions of my Worldview

Urs Boeschstein

## Worldview-Revisions Weltbildhaus-Umbauten

On the Fundamental Assumptions of my Worldview.

Human thinking, we assume, is a brainprocess. We also assume that *our* thinking is different from the thinking processes in animal brains. Humans can speak, animals cannot. What makes human brains different? Over the past six million years the human brain evolved the capacity to reprogram itself with an astonishing result: We humans can share ideas, we can communicate *stories*, we invented „meaningful information“. Ever since we humans learnt to keep records of these stories, ever since we learnt to paint stories on rockwalls, we needed to evolve an additional capacity: We humans can transform information, raw data, into „meaning“, we can *interpret* stories, *read* stories, *understand* stories: We developed meaningful worldviews - we learnt to reflect, we learnt to ask questions: Who are we? Where do we come from? Where are we going? Some of us even learnt to modify our worldviews by asking questions about our „blind spots“, questions about the origin of our „knowing“, questions about what we cannot „know“, about the basic axioms we need to „assume“ in order to believe that we can know.

This essay is about Epistemology<sup>1</sup>. It is about *my* epistemology, about changes in the hidden assumptions of my thinking. It is the story of my attempts to reconstruct, to revise my Weltanschauung, to acquire new views on matters that I can reflect on and matters I was brought up to believe. It is about some important and fundamental changes in my beliefsystem - in short, it is about „**worldview-revisions**“. Reconstructing my Worldview is an ongoing process, because in my lifetime, the second half of the 20th century, there have been deep changes in our basic assumptions and presuppositions.

It is no secret that we are in the midst of an information-processing revolution based on electronic computers and optical communication systems. This revolution has transformed work, education, and thought, and has affected the life of every person on earth. Seth Lloyd

Although I am writing this text on a computer (and I use the internet to check information), I am still basically a reader, the result of a previous information-processing revolution: the printing press:

The invention of the printing press was an information-processing revolution of the first magnitude. Movable type allowed the information in each book, once accessible only to the few people who possessed the book's hand-copied text, to be accessible to thousands or millions of people. The resulting widespread literacy and dissemination of information, completely transformed society<sup>2</sup>.

I am a reader. I collect ideas from books. My way of rethinking, of transforming my worldview – my Weltbildhaus - is reading books. Reading gives me access to the minds of fellow humans. Reflecting on what they are trying to tell me, re-thinking their stories, allows me to learn to ask new questions. Philosophers and scientists ask questions and I, the reader<sup>3</sup>, must try to understand and order in my mind what they communicate. Some books I need to read many times to be able to integrate what their authors are telling me. What fascinates me in reading books is the *story* that is told in every book. Every story has opening questions

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<sup>1</sup> **Epistemology** from Greek *ἐπιστήμη* (*epistēmē*), meaning "knowledge, understanding", and *λόγος* (*logos*), meaning "study of") is the branch of philosophy concerned with the nature and scope (limitations) of knowledge. It addresses mainly the following questions: What is knowledge? How is knowledge acquired? To what extent is it possible for a given subject or entity to be known?

<sup>2</sup> Seth Lloyd The computational universe, in „Information and the Nature of Reality“, From Physics to Metaphysics, ed. Paul Davies/Niels Gregersen, Oxford 2010

<sup>3</sup> To read: From Old English *rædan* ("advise, read"), from Proto-Germanic *\*rēdanan* ("advise, counsel"). The development from 'advise, interpret' to 'interpret letters, read' is unique to English. Reading is a complex cognitive process of decoding symbols in order to construct or derive meaning. It is a means of communication, and of sharing information and ideas. Like all language, it is a complex interaction between the text and the reader which is shaped by the reader's prior knowledge, experiences, attitude, and language community which is culturally and socially situated. (Wicki)

and every story develops through a sequence of questions that lead to concluding questions which project into the future.

I have trained myself to start reading books from the last pages backwards to the first pages, from the epilogue to the prologue. This method of reading backwards helps me to understand, to digest a story's „train of thought“, the history of its arguments; it makes me „see“ what questions are asked and this helps me to ask questions myself. One important book which helped me to order and re-order ideas - Anthony Wilden's „System and Structure“ - confronted me with this postscript<sup>4</sup>:

„The theoretical questions around which this book is articulated are those which lie behind - in a real and material sense - every other question about future evolution, ecology, revolution. I know little - yet - of the possible solutions - but the first step is to discover the real nature of the questions. And only when man-and-womankind can truly say: "We and the earth, our mother, are of one mind", will these questions have been answered in the most real and material sense. Then and only then will the human revolution have finally taken place“.

Learning to read books backwards taught me a most important lesson: I believe that learning to *ask new questions* is the most important task in human life. Asking *meaningful questions* is what makes us human. It also made me realise a second lesson: It is not the answers that we find in books, it is the questions that we learn to ask, that make us *creative* humans. Answers are always provisional, questions seem to be perennial. I started my long journey into asking new questions thirty years ago with Gregory Bateson's Steps to an Ecology of Mind, in which he proposed:

**„a new way of thinking about ideas and about those aggregates of ideas which I call „minds“.** This way of thinking I call the „ecology of mind“, or the ecology of ideas. It is a science which does not yet exist as an organised body of theory or knowledge. The questions which the book raises are ecological: **How do ideas interact?** Is there some sort of natural selection which determines the survival of some ideas and the extinction or death of others? What sort of economics limits the multiplicity of ideas in a given region of mind? What are the necessary conditions for stability (or survival) of such a system or subsystem? The main thrust of the book is to clear the way so that such questions can be meaningfully asked<sup>5</sup>.

The third lesson I learnt on my reading-excursions concerns „clearing the way to ask meaningful questions“ in the realm of human thinking. It is to keep my attention focused on the fundamental background assumptions - on what is „naturally true“ or „naturally real“ for every author. Most of the authors of the books I read are my contemporaries, they all ask their questions from similar premises, from a similar background - the cultural background of twentieth century Western Thinking. I want to learn to question this background, to question the fundamental assumptions that are hidden, the presuppositions that make asking questions possible. From a search for "secure" scientific knowledge we have moved to what I call a „Wisdom of Insecurity“<sup>6</sup>. We are no longer satisfied with "factual knowledge" - we search for *meaning*, for the *significance* of life. In this search we shall have to ask questions about our language, about meaning<sup>7</sup>, about circularity and self-reference, about information and creativity, about „self“ and other „selves“, about consciousness, about life and experience of life. We shall have to re-think our basic assumptions and reflect on matters of epistemology. I found, thirty years ago, in Douglas Hofstadter's book „Gödel, Escher, Bach“ a first formulation of the transition from „object-thinking“ to „process-thinking“, from „individual consciousness“ to a „social consciousness“ - a fluid epistemology that reintroduces „Me“ (as an individual) into the realm of „Us“ (social thinking).

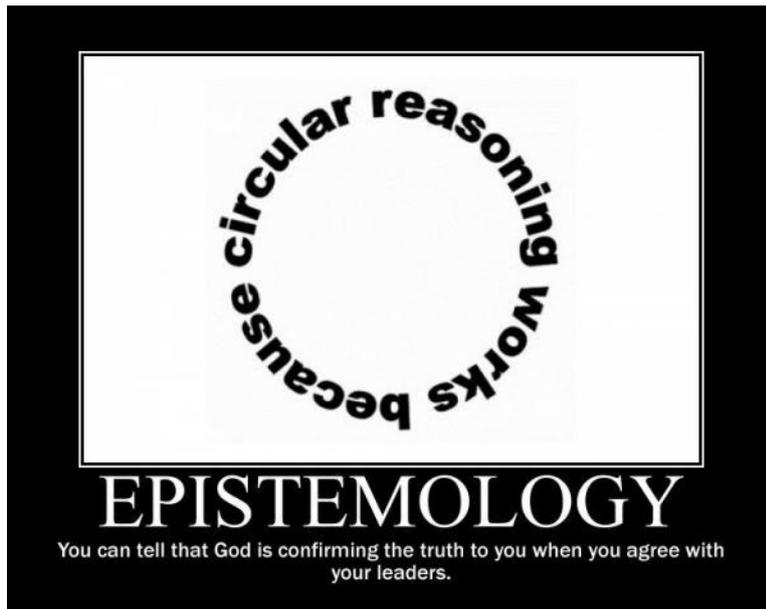
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<sup>4</sup> Anthony Wilden System and Structure (1972), pg.487

<sup>5</sup> Gregory Bateson Steps to an Ecology of Mind, Ballantine Books 1972, pg. xv

<sup>6</sup> Urs Boeschstein: Weisheit der Unsicherheit: „Wisdom of Insecurity“

<sup>7</sup> 'Sinn' ist als die fundamentale Ordnungsform menschlichen Erlebens gedacht, die alles, was erlebt wird, in einen Horizont anderer Möglichkeiten plaziert und damit selektiv stellt.". Luhmann, N., Einfache Sozialsysteme, in: Soziologische Aufklärung 2, Opladen 1975, S.21-38, S.22.



### Some preliminary remarks on my fundamental beliefs

I believe that „circular reasoning works because circular reasoning works because circular reasoning works“. I believe that human communication is a circular process, which determines what we can know; it is a process that evolved from processes of interaction that emerged in the 13,7 billion year history of the universe that we humans can describe.

I do NOT believe in the truth of the sentence: „You can tell that God is confirming the truth to you when you agree with your leaders“. This sentence - in my 2012 worldview - is utterly wrong, utterly stupid, utterly dangerous - the result of a cognitive aberation of the past two thousand years of human thinking in which „knowing“ was confounded with „believing“.

I believe that we need to study the history of human beliefs, the history of human ideas and I believe that reflecting on the hidden assumptions of the „knowledge“ of our ancestors is a necessary step on the path to a worldview of the future.

*The Holy Bible The First Book of Samuel Otherwise Called, The First Book of the Kings Israel Asks for a King: And it came to pass, when Samuel was old, that he made his sons judges over Israel. Then all the elders of Israel gathered themselves together, and came to Samuel unto Ramah, and said unto him, Behold, thou art old, and thy sons walk not in thy ways: **now make us a king to judge us like all the nations.** But the thing displeased Samuel, when they said, Give us a king to judge us. And Samuel prayed unto the LORD. And the LORD said unto Samuel, Hearken unto the voice of the people in all that they say unto thee: **show them the manner of the king that shall reign over them.** And Samuel told all the words of the LORD unto the people that asked of him a king. And he said, This will be the manner of the king that shall reign over you: *He will take your sons, and appoint them for himself, for his chariots, and to be his horsemen; and some shall run before his chariots. And he will appoint him captains over thousands, and captains over fifties; and will set them to ear his ground, and to reap his harvest, and to make his instruments of war, and instruments of his chariots. And he will take your daughters to be confectionaries, and to be cooks, and to be bakers. And he will take your fields, and your vineyards, and your oliveyards, even the best of them, and give them to his servants. And he will take the tenth of your seed, and of your vineyards, and give to his officers, and to his servants. And he will take your menservants, and your maidservants, and your goodliest young men, and your asses, and put them to his work. He will take the tenth of your sheep: and ye shall be his servants.* And ye shall cry out in that day because of your king which ye shall have chosen you; and the LORD will not hear you in that day. Nevertheless the people refused to obey the voice of Samuel; and they said, **Nay; but we will have a king over us; that we also may be like all the nations; and that our king may judge us, and go out before us, and fight our battles.** And Samuel heard all the words of the people, and he rehearsed them in the ears of the LORD. And the LORD said to Samuel, **Hearken unto their voice, and make them a king.***

I was made to believe in the LORD and the truth of the LORD's word when I was a child. In my family we read the Holy Bible every day – at dawn my father gathered his children and taught us what to believe and what to think<sup>8</sup>. I learnt to obey and to accept authority, and I also learnt to view the world as a permanent war, a worldwar<sup>9</sup> of the dark powers of evil Sin against the shining Spirit of the LORD.

As an adolescent I ran into problems with „authority“<sup>10</sup>. The rector of my teachers training college was a protestant theologian, who believed in the literal truth of the Scriptures.

I pestered him with pertinent question which for him were exceedingly „impertinent“. At seventeen I was relegated from the college. From then on, I was on my own. I became a taxidriver to earn my living and I became a reader, ten to twelve hours a day..

In my early adult life, when I studied linguistics and slowly learnt to reflect, my beliefsystem changed: I no longer believe in eternal truths, but in an ongoing history of ideas in emerging human thinking.

I believe there is no God, there are only ideas of Gods invented by human beings.

I believe there is no Truth, there are only stories told by speaking humans.

I believe there are no godgiven kings, there are only human beings constructing a common social world. I believe that there are no battles to be won, there are only communicative interactions among humans that „appear“ in two forms: togetherness and againstness.

I believe that we are slowly realising that the dichotomy of competition and cooperation needs a new discription, a new evaluation.

*My new evaluation is the result of many years of reading, studying books about human history, the history of that unique way of communication that emerged with cooperation among highly socialised bands of primates, in which the two principles, competition and cooperation, are balanced. I believe that all interactions among humans are made possible by a finely tuned equilibrium of affilial and agonal tendencies in our behaviour<sup>11</sup>. We did not descend from murderous apes and our forebears did not live in a world of permanent warfare. For the past two to three million years humans learnt to live in egalitarian societies that were capable of forming alliances with their neighbouring groups. They developed a **culture of cooperation** in which competion was strictly controlled. In such groups there were no chiefs, there was no authority, but there were many rituals that bound members together. I also believe that competition only became the guiding principle in the past five thousand years, when the population density of humans grew exceedingly, when the first towns appeared and neighbours could no longer be neighbours, when groups needed „authorities“ to organise their communal rituals. Only then, in stratified societies, did war, organised aggression, arise; and only then did „organised religion“, in which a transcendental god controls his flock, appear in the world of human thought. My third deep belief is hope for the future – a future that might bring about a new balance: that humanity will learn to forget the battle of Good and Bad, and will learn to live in a world in which there are no battles to be won. In the course of the fifty years that I studied history, anthropology and sociology, I became a firm un-believer. I do not believe in authority, I do not believe in hierarchy, top-down control, and I do not trust „traditional“ thinking. I believe our world is an unfathomable, circular process that is creating not a „universe“, but a multiverse beyond our comprehension. I believe that we humans can only see a „one“-verse, a „reality“, in which we *experience* being alive as reasoning beings who can reflect on our existence.*

Above all, I believe that in the future the thinking-style of *homo sapiens* will change, and that will involve deep worldview-revisions. I am neither a professional philosopher seeking „truth“, nor am I a scientist attempting to describe „laws of nature“.

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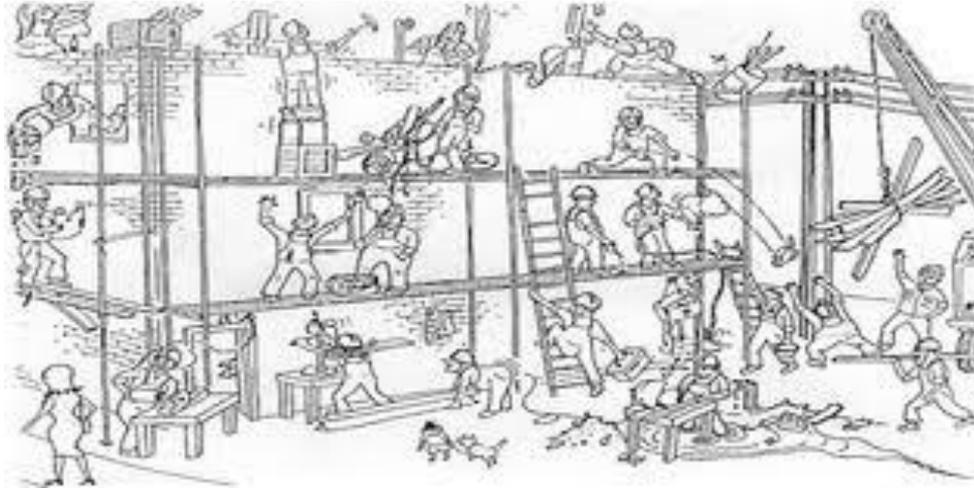
<sup>8</sup> For the past seventy years, I have suffered from an „eclesio-genic neuroses“. I cannot „think“ about „beliefs“ without getting angry, a problem that will probably stay with me for life. I beg the readers pardon.

<sup>9</sup> When I was nine years old I had a map of Europe on the wall of my bedroom, on which I marked with little flags the progress of the last battles of Worldwar II.

<sup>10</sup> Urs Boeschstein: On Authority

<sup>11</sup> Irenäus Eibl-Eibesfeldt: *Liebe und Haß. Zur Naturgeschichte elementarer Verhaltensweisen*. München 1970.

I sit somewhere in between. Maybe I am a wizard or witcher, one who can „separate out“ but who cannot or does not want to decide which side to take<sup>12</sup>. I remain sitting on the fence, a boundary-sitter<sup>13</sup>, who tries to see both sides of every distinction. I do believe that one important boundary needs to be preserved - the distinction Belief/Knowledge. I do not trust „believers“, I want to „know“ - about the conditions and assumptions *and* the fundamentals which might allow me to reflect on the really important questions, the really important vocabulary regarding modifications of my worldview „under construction“.



<sup>12</sup> Urs Boeschstein Beim Nachdenken über Sprache: Das Denken muss sich selbst hinterfragen. Diese Reflexion erfordert eine andere Sprachform, eine Sprache in der Wörter (Symbole) „keine abbildende, auch keine repräsentierende Funktion (Luhmann) haben. Meine Selbstbeobachtungen haben mich in viele Denkräume geführt. Ich musste lernen zu erkennen, dass ich nicht „wissen kann, wer ich bin. Ich musste auch lernen die einfache Unterscheidung von Physik (Realität) / Metaphysik (Transzendenz) zu hinterfragen und mir das „Dahinter“ nicht mehr vorzustellen. Ich musste lernen von der Grenze aus, vom Dritten aus zu denken. Unterwegs zu dieser Erkenntnis habe ich viele Geschichten von Metaphysikern studiert, die nach dem *Dahinter* fragten und das Unbeschreibbare in vielen Formen beschrieben. Jahrhundertlang haben sie dem Unsichtbaren Namen gegeben: die Geister, die Ahnen, die Götter, den einen Gott, oder – das Nichts. Ich suchte viele Jahre lang Antworten in der Psychologie des Unbewussten, habe mich dabei aber trotz *verzweifelter* Suche nicht gefunden. Meine „innere Ruhe“ habe ich erst als alter Mann beim **Drei-feln**, beim Sitzenbleiben auf der Grenze gefunden. Nachdenken über das Nachdenken – Reflexion III - ist, so will mir scheinen, die einzige brauchbare Methode. Ich beobachte mich selbst als Beobachter 2. Ordnung und lernte auf der Grenze meiner „ersten Unterscheidung“ sitzenzubleiben, ich werde dabei ein *Hagazussa*, ein Grenzsitzer, kann „erkennen“, was in der „Welt“ ist *und* was „jenseits der Welt“ ist? ...liegt? ...sich befindet? ...sichtbar ist? Ich fange hier an, mir am „Unsagbaren“ die Zähne auszubeissen.

<sup>13</sup> From Middle English *wicche*, from Old English *wicce* (“sorceress, witch”) and *wicca* (“wizard, sorcerer, warlock”), from Proto-Germanic *\*wikjō* (“necromancer, waker of the dead”) (compare West Frisian *wikke* (“witch”), Low German *wikken, wicken* (“to use witchcraft”), Old High German *wīhan* (“to consecrate”), Old English *wigle* (“divination”)), from Proto-Indo-European *\*weik-* ‘to choose, sacrifice, conjure’; akin to Latin *victima* (“sacrificial victim”), Lithuanian *viekas* (“life-force”), Sanskrit (*vinākti*, “to sift, separate out”).

## On fundamental assumptions and presuppositions

„I think that Descartes' first epistemological steps - the separation of mind from matter and the cogito - established bad premises, perhaps ultimately lethal premises, for Epistemology, and I believe that Jung's statement of connection between Pleroma and Creatura is a much healthier first step. Jung's epistemology starts from comparison of **difference** – not from matter. So I will define **epistemology as the science that studies the process of knowing** – the interaction of the capacity to respond to differences, on the one hand, with the material world in which those differences somehow originate, on the other. Every human individual – every organism – has his or her personal habits of how he or she builds knowledge, and every cultural, religious, or scientific system promotes particular **epistemological habits**“.

Gregory Bateson<sup>14</sup>

"The **knowledge of knowledge** compels. It compels us to an attitude of permanent vigilance against the **temptation of certainty**. It compels us to realise that the world everyone sees is not the world but a world, which we bring forth with others. It compels us because, when we know that we know, we cannot deny (to ourselves or to others) that we know".

Maturana/ Varela

Friends, compassion, magnanimity: I find myself led to the unexpected conclusion that what seems to be the epitome of selfhood - a sense of „I“ - is in reality brought into being if and only if along with that self there is a sense of other selves with whom one has bonds of affection. In short, only when generosity is born is an ego born. Our glory as human beings is that, thanks to being beings with brains complicated enough to have friends and to feel love, we get the bonus of experiencing the vast world around us, which is to say, we get consciousness.

Douglas Hofstadter<sup>15</sup>

„**Self-awareness** emerged during the evolution of our hominid ancestors together with language, conceptual thought and the social world of organised relationships and culture“. Fritjof Capra

"**Leben ist laufende Rekonstruktion der Welt**".

Niklas Luhmann

We need to reflect on our „epistemological habits“, our „first epistemological steps“ to be able to ask „meaningful questions“. We need to accept that we do not know what „meaning“ is. Humans cannot *know* the meaning of meaning. In order to *make sense* of the world we live in, we need to *assume* that we know what the world is, that we know its *reality*. However, as Niklas Luhmann tells us, „**Leben ist laufende Rekonstruktion der Welt**“ – Life is a continuous re-construction of our Lebenswelt<sup>16</sup>. Our minds construct a world, our minds do not construct *the* world: „The world everyone sees is not *the* world but a world, which we bring forth with others“. I came across this key sentence many years ago reading „The Tree of Knowledge“ by Humberto Maturana and Francisco Varela. Ever since, I have lived in a world in which there is no final knowledge, a „worldviewhouse“ that is under continuous reconstruction. I no longer ask what the world *is*, I ask how I can find an adequate or viable worldview that allows me to make decisions here and now.

To achieve this I need to reflect on my „most profound ontological presuppositions“: I do not see the world, I *construct* the world with my mind. I am not looking outside, I can only introspect. I need to reorganise my „Weltbildhaus“ from its base. This is a difficult task: „A worldview is a network of presuppositions which is not verified by the procedures of natural science but in terms of which every aspect of man's knowledge and experience is interpreted and interrelated“<sup>17</sup>. Out of this network of presuppositions my brain constructs the building blocks, the ideas and images, which form my *Weltbildhaus* (the ontological form of my worldview as a fixed structure).

<sup>14</sup> Gregory Bateson Where Angels Fear.., pg.20

<sup>15</sup> Douglas Hofstadter „I am a Strange Loop“, Perseus Books, 2007, pg. 354

<sup>16</sup> Der Begriff der **Lebenswelt** bezeichnet die menschliche Welt in ihrer vorwissenschaftlichen Selbstverständlichkeit und Erfahrbarkeit in Abgrenzung zur theoretisch bestimmten wissenschaftlichen Weltansicht. (Wiki)

<sup>17</sup> A comprehensive world view is the fundamental cognitive orientation of an individual or society encompassing the entirety of the individual or society's knowledge and point-of-view. The term is a calque of the German word *Weltanschauung*, composed of *Welt* ('world') and *Anschaung* ('view' or 'outlook'). It is a concept fundamental to German philosophy and epistemology. ” (Wicki)

As a speaking human I transform the swirling process of concept formation into a fixed, stable reality. I build a *real worldview house*<sup>18</sup> - a place that protects me, a place where I can hide, a place that is situated in a *real* surrounding, my world.



But, is my house really real? The semiotician John Deely remarks<sup>19</sup>:

“Language presupposes a difference in the fundamental way of cognizing the world. The question “How are things really?”, arises only among linguistic animals, only among human beings. By exapting language into the external forms of speech and writing we can communicate to our conspecifics our own doubts or convictions about the way things “really are”. Unfortunately, nothing guarantees that we will be right in particular cases, and few things are more difficult, even in limited cases than determining how things “really are”.

Is reality really real? Such epistemological questions about the *Reality of reality* were first treated in the writings of the early philosophers in Greece. “Socrates argues that the invisible world is the most intelligible (“noeton”) and that the visible world (“(h)oraton”) is the least knowable, and the most obscure”<sup>20</sup>. Where did this fundamental distinction visible/invisible originate? Did our hunter-gatherer ancestors divide their world in such a way? When and how did humans begin to use the matter/mind distinction that became the „natural“ split of the first scientists five hundred years ago: Descartes divided his world into two fundamental kinds of „stuff“ - *res extensa* and *res cogitans*.

In the second half on the 20th-century biologists and anthropologists began to ask new questions about reality. Gregory Bateson remarked „*the separation of mind from matter and the cogito -- established bad premises, perhaps ultimately lethal premises, for Epistemology*“. Humberto Maturana and Francisco Varela developed ideas on a biology of cognition – „*an alternative view of the biological roots of understanding - a way of seeing cognition not as a representation of the world „out there“, but rather as an ongoing bringing forth of a world through the process of living itself*“.

In the following chapters I shall try to bring everything I learnt into a linear order, knowing full well that the possibly most important term, *circularity*, forbids linear ordering. But as a speaking animal telling his story, I shall always have to follow a temporal line, so, I need to decide where to start. How can I order this jumble of questions into a linear story?

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<sup>18</sup> The English word *house* derives directly from Old English *Hus* meaning "dwelling, shelter, home, house," Middle English *hous*, *hus*, from Proto-Germanic *\*hūsan* (compare Dutch *huis*, Low German *Huus*, German *Haus*), possibly from Proto-Indo-European *\*(s)keus-*, from *\*(s)keu-* 'to hide' . (Wicki)

<sup>19</sup> John Deely *Four Ages of Understanding*, University of Toronto Press, 2001, pg. 489.

<sup>20</sup> Socrates inverts the common man's intuition about what is knowable and what is real. While most people take the objects of their senses to be real if anything is, Socrates is contemptuous of people who think that something has to be graspable in the hands to be real. Such people live without the divine inspiration that gives him, and people like him, access to higher insights about reality. Socrates's idea that reality is unavailable to those who use their senses is what puts him at odds with the common man, and with common sense. Socrates says that he who sees with his eyes is blind, and this idea is most famously captured in his allegory of the cave, and more explicitly in his description of the divided line.(Wicki)

What is truly the foundational question to ask? Is it about *human communication and language* (and its use as a „fungierende Ontologie“<sup>21</sup>), is it about the *observer* (and his blind spots), is it about *non-trivial machines*, or is it perhaps - *the first act* - as in Spencer Brown's *Laws of Form* (with its injunction: Draw a distinction!). With a lot of intuitive gut-feeling, I decided to start with basic ideas on „shifting forms“ that I learnt reading George Spencer Brown's *Laws of Form*:

The theme of this book is that **a universe comes into being when a space is severed to or taken apart**. The skin of a living organism cuts off an outside from an inside. So does the circumference of a circle in a plane. By tracing the way we represent such a severance, we can begin to reconstruct, with an accuracy and coverage that appear almost uncanny, the **basic forms** underlying linguistic, mathematical, physical, and biological science, and can begin to see how familiar **laws of our own experience follow** inexorably from **the original act of severance**. The **act** is itself already remembered, even unconsciously, as **our first attempt to distinguish different things** in a world where, in the first place, the boundaries can be drawn anywhere we please. At this stage the universe cannot be distinguished from how we act upon it and the world may seem like shifting sand beneath our feet<sup>22</sup>.

This „shifting sand beneath our feet“ fascinated and troubled me. I had been socialised in a worldview that was built on Saint Peter, the apostle of hard rock eternal truths (Petrus - a Latin name derived from the Greek meaning "rock"), on the security of unmovable beliefs, that were not to be doubted. Yet I became a young adult who was plagued by nagging doubt. My worldview began to shift, lost its rock bottom security, and left me uneasy. It took me many years to become proud of being a doubter, proud to be able to let go of security and learn to swim in a sea of creative potentiality. I reconstructed my fixed, static worldview house into a *float* - blown about by the winds of chance to ever new emerging opportunities for distinguishing differently; I learnt to trust nothingness: **Omnia ex nihilo creamus** - by drawing a first distinction which can be drawn anywhere we please.



my worldview float

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<sup>21</sup> Peter Fuchs: Sobald aber wie im Fall der hier verhandelten Systemtheorie ein empirischer oder naturaler Konstruktivismus gepflegt wird, der sich auf den ‚Wirklichkeitseindruck‘ selbst bezieht, geraten systemnotwendige ‚Impedimenta‘, ‚blind spots,‘ Erkenntnisblockaden, ‚stumbling blocks‘ des je beobachteten Systems in das Blickfeld. Das, was es selbst als unhintergehbare Realität nehmen muß, als fundamentale Unaustauschbarkeit, als *seine fungierende Ontologie*, sieht sich konfrontiert mit nicht nur spielerisch angebotenen anderen Versionen dessen, was es als Unhintergebarkeiten zu behandeln hat.

<sup>22</sup> George Spencer Brown *Laws of Form*, pg.XII: (Spencer Brown)

*Caminante, son tus huellas  
el camino, y nada más;  
caminante, no hay camino,  
se hace camino al andar.  
Al andar se hace camino,  
y al volver la vista atrás  
se ve la senda que nunca  
se ha de volver a pisar.  
Caminante, no hay camino,  
sino estelas en la mar.*

Wanderer, your footsteps are  
the road, and nothing more;  
wanderer, there is no road,  
the road is made by walking.  
By walking one makes the road,  
and upon glancing back  
one sees the path  
that must never be trod again.  
Wanderer, there is no road  
Only wakes upon the sea.

Antonio Machado

It was this poem by Antonio Machado - I encountered it in a truly serendipitous moment of my life, having reached the end of the world, *finis terrae*, after a three-month journey to the field of stars, Santiago de Compostella - that helped me to learn to *float*. It was a flash of insight that transformed my whole outlook on life. I had always seen myself as the captain of my boat of life, I was the „cybernetes“ controlling the ship. In Finisterre, looking out to the rolling Atlantic waves, I threw my captain's cap away. My new worldview-float has no steeringwheel. I need to accept every moment as it comes and revise my plans accordingly. Buddhists would say, I lost my Ego. Using my very different vocabulary, I might say: I emerged from trying to control from an Ego-center to accepting myself as an observer of my many selves - my bodyself, my rational self, my irrational self, my emotional self, my crazy self, and all those „myselfs“ that I cannot even consciously know. What I do consciously know is the amazing floating feeling that „we“ - all my many selves - learnt to get along together much better. We are having a good time! We learnt to swim! In losing my ego centre, I also realised that I'm never alone. I am not a solipsistic ego, my real ego is *social*, it is my friends who transform me into what I am.

And so I find myself led to the unexpected conclusion that what seems to be the epitome of selfhood - a sense of „I“ - is in reality brought into being if and only if along with that self there is a sense of *other* selves with whom one has bonds of affection. In short, only when generosity is born is an ego born.

Douglas Hofstadter

The magic moment at „finis terrae“ catapulted me into a new universe of thought. The title of a book by Friedrich Nietzsche - *Jenseits von Gut und Böse* - popped up into consciousness. My thinking is no longer either/or – it is „both-and“. Looking at life in this way, I have no problem revising the fundamental assumption of most scientists and philosophers of the past three hundred years that our world is an *objective reality*, a predetermined machine. It is not! We live in a *creative universe* that is not a fixed, stable *thing*, but an ongoing process of emergent changes. *Caminante, no hay camino, se hace camino al andar* - the way of life is realised, made real, by walking. Life is lived by living. Knowledge is achieved by observing. *The act of observing*, the drawing of distinctions and indicating, marking one side, is the key to ordering my worldview-revision-story.

## Worldview-Revisions I - The World of Observation

Over the last decades Heinz von Foerster has brought the observer from behind the stage to the central stage of epistemological issues and discussions: the multiple dimensions of observers and the consequences of a fully-developed observer story for the status of scientific knowledge and for the social system of science in general. Siegfried J. Schmidt Heinz von Foerster's Heritage<sup>23</sup>

I encountered the new scientific term „observation“ reading books by Heinz von Foerster, in particular one with the intriguing title: *Observing systems*. The linguist in me was fascinated by the ambiguity of this short title which may be interpreted as an ontological question: What are observing systems? or as an epistemological question: How are observing systems doing what they are doing? Hidden behind this ambiguous title lies a fundamental change in the way scientists are trying to describe the world, no longer asking questions about the reality of the objects they are studying, but asking „How“-questions: How can we study processes? Foerster's booktitle *Observing systems* introduced „Second order observation“ – the observation of observation, or observing observers observe.

An *act of observing* is an act of performing two acts at the same time: to distinguish and to indicate; in *distinguishing* „a universe comes into being when a space is severed to or taken apart“; in *indicating* one side is marked and the severed universe becomes a multiverse of stable objects:

„The **act of indicating** any being, object, or unity involves making an **act of distinction** which distinguishes what has been indicated as separate from its background. Each time you refer to anything explicitly or implicitly, we are *specifying a criterion of distinction*, which indicates what we are talking about and specifies its properties as being, unity, or object. This is a commonplace situation and not unique: we are necessarily and permanently immersed in it“ Maturana/Varela<sup>24</sup>.

This distinguishing/marking act leaves an „unmarked space“ which remains unobserved, unknown and can only be observed by a subsequent, new observation. The unmarked space is our „blind spot“, the hidden background or horizon for every act of thinking. We can only think about what we see (distinguish) and not about what we do not see. This process is called an „observation of the first order“.

Second order observation observes observers of the first order. It opens a chance to reflect on other observers who „attempt to distinguish different things in a world where the boundaries can be drawn anywhere we please“ and see where others *please* to draw their distinctions. What can be thought or known depends on where a speaker draws distinctions.

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<sup>23</sup> Siegfried J. Schmidt The Observer Story: Heinz von Foerster's Heritage, [Cybernetics&Human Knowing 18](#)  
Heinz von Foerster: quotes from his papers (as collected by Siegfried Schmidt):

- **Whatever is said is said by an observer to an observer.**
- The properties of the observer and the properties of the observed cannot be conceptualized independently from one another.
- The observer does not observe in a neutral way from outside; instead he/she is enmeshed into the process of observation.
- **Observation processes depend upon the body of the observer.**
- The distinctions an observer applies are the distinctions of the observer and not those of the environment or the reality.
- The existence of the observer is constituted by/through the process of applying distinctions.
- **Distinctions are not stable identities but unstable formations.**
- Acting and gathering knowledge are inseparable from one another.
- **Reality results from observing processes.**
- Observations produce their ontology by externalizing their results of observation.
- The observer is responsible for his or her observation processes.

<sup>24</sup> Humberto Maturana/Francisco Varela The Tree of Knowledge, Shambala 1987

Observation of the second order is a very recent invention of human thinking. It appears in the earliest written texts, some one hundred generations ago (2500 years), when philosophers, lovers of wisdom, began to ask questions about *arché* ('beginning', 'origin' or 'first cause') and *apeiron* (the unlimited, infinite, or indefinite), attempting to reflect on the mysteries that lie behind the world we can perceive. How did this capacity to reflect emerge? Trying to find an answer to this question kept my mind busy for many years:

**„Reflection is a process of knowing how we know.** It is an act of turning back upon ourselves. It is the only chance we have to discover our blindness and to recognise that the certainties and knowledge of others are, respectively, as overwhelming and tenuous as our own. The phenomenon of knowing cannot be taken as though there were „facts“ out there that we grasp and store in our head. The experience of anything out there is validated in a special way by the human structure, which makes possible „*the thing*“ that arises in the description. This circularity, this connection between action and experience, this inseparability between a particular way of being, and how the world appears to us, tells us that *every act of knowing brings forth a world*. **All doing is knowing, and all knowing is doing.** Every reflection, including one on the foundation of human knowledge takes place in language, which is our distinctive way of being human and being humanly active: **Everything said is said by someone**“.

Humberto Maturana

**Whatever is said is said by an observer to an observer.**

Heinz von Foerster<sup>25</sup>

I learnt to read between the lines, reflecting on basic ideas, asking new questions, and slowly learning to interpret the concise epigrams of Heinz von Foerster by acquiring an updated vocabulary:

20. **The nervous system** is organized (or it organizes itself) so as to **compute a stable reality**.

21. The Logic of the World Principle: "The logic of the world is the logic of descriptions (of the world)."

22. **Necessity** arises from the inability to **make infallible deductions**.

23. **Chance** arises from the inability to **make infallible inductions**.

I learnt to accept: Yes, of course, it is my nervous system that creates my reality! All living organisms create „reality“ inside. And: Yes, indeed, „The logic of the world is the logic of descriptions (of the world)“, we cannot *know* the world, we can only *describe* it in the social medium of meaning which we inherited from our hunter-gatherer ancestors who invented verbal communication. They ordered their „descriptions of the world“ in stories, in ideas which they learnt to share. We know little about the words they used and the order or structure (syntax) of their ideas, but we may assume that they lived in a world of very concrete ideas in which no abstract entities like „truth“ or „being“ had yet been developed.

We owe our abstract vocabulary of „necessity“ and „chance“, the logic of deductions and inductions, to Greek philosophers who learnt to write their stories, sharing them with a much wider audience. They asked their questions in a world of eternal truths, a world of fixed, stable, unchangeable entities. Their basic assumptions were very different from the world of processes into which we were catapulted in the 20th century.

To update my Weltbildhaus to a 2012 version, I need a new vocabulary and new ways of thinking to describe the complex network of brain-processes, or better, we need to re-study thought processes, if we want to understand how we became *homo sapiens*, knowing animals, how we learnt to reflect: „To analyze thought properly, one must attend to two types of mental process by which people generate for themselves mental interpretations of the way the world is“, writes Laura Weed, „humans have two distinct methods by which they characterize their experience for themselves, and therefore, two quite differently organized types of experiences of mental data can be presented to the mind for thought“<sup>26</sup>.

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<sup>25</sup> Heinz von Foerster <http://www.uboeschenstein.ch/texte/Foerster1995.pdf>

<sup>26</sup> Laura E. Weed The Structure of Thinking A Process-Oriented Account of the Mind, Imprint Academic 2003: <http://www.uboeschenstein.ch/texte/weed5.html>

A book I read eighteen years ago, Damasio's „Descartes' Error“<sup>27</sup>, helped me to overcome two distinctions that are built into traditional Western thinking: the dichotomies *mind/matter* and *reason/emotion*. In a viable worldview we should no longer reify, or objectify processes: „res extensa“ and „res cogitans“ are not things, reason and emotions are not separate objects:

„Reason may not be as pure as most of us think it is or wish it were, emotions and feelings may not be intruders in the bastion of reason at all: they may be enmeshed in its networks, for worse and for better. The strategies of human reason probably did not develop, in either evolution or any single individual, without the guiding force of the mechanisms of biological regulation, of which emotion and feeling are notable expressions. Even after reasoning strategies become established in the formative years, their effective deployment probably depends on a continued ability to experience feelings“.

Reflecting on Damasio's „strategies of human reason“ and „mechanisms of biological regulation“ helped me to integrate into my worldview an important conceptual shift in thinking: Our thinking processes are not purely rational as was assumed by most philosophers in the past four hundred years, every act of thinking necessarily includes an emotional evaluation. We *experience* life. We do not calculate life in a linear thought process, there are indeed „two types of mental processes“ built into our brains by evolution, a process of abstract digital calculation and a process of analog evaluation, two ways of thinking: linear and non-linear. Heinz von Foerster proposed two kinds of „machines operating“<sup>28</sup>:

24. **Trivial Machines:** "(i) Synthetically determined; (ii) History independent; (iii) Analytically determined; (iv) Predictable."
25. **Non-Trivial Machines:** "(i) Synthetically determined; (ii) History dependent; (iii) Analytically indeterminable; (iv) Unpredictable."
26. **Recursively Operating Non-Trivial Machine:** "Computing Eigen-Values, Eigen-Behaviours, Eigen-Operators, Eigen-Organizations, etc..."

Reading this for the first time my non-mathematical brain had refused to understand. Trying to compute all these new terms (to compute<sup>29</sup> originally meant to order) required years of re-reading and re-reflection, only slowly learning to pass from linear ontological thinking to non-linear process-thinking, from calculating predicable trivial machines to describing recursively operating non-trivial Machines computing EigenValues, Eigen-Behaviours, Eigen-Operators, Eigen-Organizations.

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<sup>27</sup> Antonio R. Damasio *Descartes' Error, Emotion, Reason, and the Human Brain*; Grosset / Putnam 1994: Although I cannot tell for certain what sparked my interest in the neural underpinnings of reason, I do know when I became convinced that the traditional views on the nature of rationality could not be correct. I had been advised early in life that sound decisions came from a cool head, that emotions and reason did not mix any more than oil and water. I had grown up accustomed to thinking that the mechanisms of reason existed in a separate province of the mind, where emotion should not be allowed to intrude, and when I thought of the brain behind that mind I envisioned separate neural systems for reason and emotion. This was a widely held view of the relation between reason and emotion, in mental and neural terms. <http://www.uboeschenstein.ch/sal/damasio11.html>

<sup>28</sup> The concept of 'machine' was elaborated by Turing (1937, 1950) in developing an approach to the symbolic description of the operations which occur in logic. A concept of this kind, which is the basis of the theory of automata, prefigures the study of the logical structure of computers by formalizing the notion of algorithm. The distinction between trivial and non-trivial machines was developed by Heinz von Foerster (1985). The trivialization of a system consists in reducing it to the model (machine) that has been made of it. Trivial and non-trivial machines can be formal means of grasping living systems. The trivial machine is a machine that repeats without error. Any relation between a stimulus and a response remains self-identical (algorithm). The non-trivial machine is a machine which is so complex as to prevent an analytical knowledge of its operation. It is a black box. What goes into the machine belongs to an alphabet of inputs, what comes out of it to an alphabet of outputs. The function F is a univocal relation between the input and output alphabets. Each input has one output attributed to it and one alone. This is the model of logical thought and of many concepts in physics, the logic of behaviour etc. [http://www.blackwellreference.com/public/tocnode?id=g9780631170488\\_chunk\\_g978063117048816\\_ss1-1](http://www.blackwellreference.com/public/tocnode?id=g9780631170488_chunk_g978063117048816_ss1-1)

<sup>29</sup> Heinz von Foerster: „Rechnen heisst ursprünglich „in Ordnung bringen, ordnen“. Ich möchte den Begriff des „Rechnens“ in diesem sehr allgemeinen Sinn verwenden, um jede (nicht notwendig numerische) Operation zu benennen, die beobachtbare physikalische Entitäten (Objekte) oder deren Symbole transformiert, modifiziert, ordnet, neu ordnet usw.“.

„Die ganze Welt, ist, so behaupte ich, eine nichttriviale Maschine“ (The whole world is a nontrivial machine<sup>30</sup>), I had read a long time ago in one of Heinz von Foerster's books. The terms „trivial“ and „nontrivial“ opened a way to reflect on a troubling question: Is my brain a digital computer? I had been told in many books that computers are artificial brains, and although I somehow doubted this, I could not reflect on my doubts. Heinz von Foerster's new vocabulary (which for me was exceedingly difficult to learn) allowed me to ask new questions: What is the difference between artificial brains and central nervous systems of living organisms? I constructed a simplified answer: Machines are preprogrammed and can only reproduce „correct“ answers, brains are programming themselves, they can learn, they are creative, they can observe themselves. Looking back over vaster expanses of evolutionary time - I came to realise that the emergence of *first order observation* must be linked to the appearance of a universe of language, when homo became *homo designans*<sup>31</sup> – man the pattern maker, who invented a universe of sign-patterns, a universe of meaning – a semiosphere<sup>32</sup>.

Living organisms create order out of unordered, chaotic nothingness. I also realised that as a homo loquens, I am stuck in my observations of the first order. But - my using language in *communication* necessarily transforms me into an observer of the second order. I quote Heinz von Foerster<sup>33</sup>:

“Humberto Maturana's Theorem Number One”: “**Anything said is said by an observer.**” I would like to add to Maturana's Theorem a corollary: “**Anything said is said to an observer.**” With these two propositions a nontrivial connection between three concepts has been established. First, that of an *observer* who is characterized by being able to make descriptions. The second concept is that of *language*. We connect two observers through language. But, in turn, by this connection we have established the third concept, namely that of **society**: the two observers constitute the elementary nucleus for a society.

This „third concept, that of *society*“ is explained as *structural coupling* by Maturana/Varela. They describe three levels of structural coupling in the evolution of life: first order - in the coupling of molecules to cell-units; second order - in the coupling of cellular units into metacellular units, and a third order coupling – in the formation of „social units“.

„It is possible for interactions between organisms to acquire in the course of their ontogeny a recurrent nature. This will necessarily result in their consequent structural drifts: co-ontogenies with mutual involvement through their **reciprocal structural coupling**, each one conserving its adaption and organisation. When this happens, the co-drifting organisms give rise to a new phenomenological domain: **third-order structural couplings** (pg. 180).

We call **social phenomena** those phenomena associated with the participation of organisms in constituting third-order unities. As observers we designate as *communicative* various behaviours which are occur in social coupling, and as *communication* that behavioural coordination which we observe as a result of it“ (pg. 195).  
Maturana/Varela

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<sup>30</sup> Soren Brier: „Organismen sind keine trivialen Maschinen. Nichttriviale Maschinen verändern ihren Zustand (ihre Rechenweise) jedesmal, wenn sie eine Berechnung angestellt haben. Dies macht sie für einen Aussenbeobachter unberechenbar (transcomputational)... Von Foerster wählt als sein Forschungsprogramm zweiter Ordnung die Suche nach einer Epistemologie nichttrivialer Maschinen. Es ist eine Epistemologie, die so selbstorganisiert ist, wie der Beobachter selbst und das Beobachtungssystem, das er beobachtet. Dies ist eine grundsätzlich andere Metaphysik als diejenige der mechanischen Materialisten und derjenigen, die an eine klassische lineare Logik als Wesen menschlicher Intelligenz glauben“.

<sup>31</sup> Ranulph Glanville: A (Cybernetic) Musing: Wicked Problems Cybernetics & Human Knowing. Vol. 19, 1-2:: Man the Pattern Maker (Homo Designans)

<sup>32</sup> Jesper Hoffmeyer: A Universe of Meaning: „The semiosphere is a sphere like the atmosphere, hydrosphere, or biosphere. It permeates these spheres from their innermost to outermost reaches and consists of communication.“ (Hoffmeyer 1996)

<sup>33</sup> Heinz von Foerster: The Cybernetics of Cybernetics

Such third-order units – ant hills, fish swarms, wolf packs, chimpanzee troupes and human societies – are sometimes called „super-organisms“, new emerging entities in which the process we call „communication“ becomes observable as the basic form of „behavioural coordination“. In an early paper (1962) by Heinz von Foerster I found a fascinating explanation for the „power of communication“:

A **coalition** is a much more sophisticated structure than a **competition**, because it requires the possibility of the elements to communicate with each other. As you probably know, all social animals— bees, ants, or animals that live in herds - constantly exchange denotative information about food, danger, and individual states of mind. I could give you a host of fascinating examples of information exchange in animals. And it is quite obvious that those poor creatures doomed incommunicado have to resort to a rather poor competitive game. Since evolution is cashing in at even the slightest edge of an advantage, it is clear that **evolution fosters communication**<sup>34</sup>.

Could it be that evolution *fostering communication* might also in the future foster „*super-communication*“?

Could we imagine forms of cooperation, forms of communication beyond the first level of „coordination of behaviour“ and beyond the second level of „coordination of coordination of behaviour“ in the human linguistic domain?

Could it be that there is a third level of coordination?

Could it be that there is a higher level of observation emerging in the world of thought, an *observation of the third order*, a reflexion of reflexion of reflexion, the emergence of a third dimension of thought?<sup>35</sup>

Could it be that „love“ is not only the mainspring of *man's* cultural and spiritual evolution, but of the evolution of the whole universe?

Could it be that we should think of „spiritual evolution“ as originating in „universal love“ that is pointing to a *universal evolution*, to „a universe that is constructed in order to see itself“, as George Spencer Brown tells us:

“Let us then consider, for a moment, the world as described by the physicist. It consists of a number of fundamental particles which, if shot through their own space, appear as waves, and are thus, of the same laminated structure as pearls or onions, and other waveforms called electromagnetic which it is convenient, by Ockhams's razor, to consider as travelling through space with a standard velocity. All these **appear bound by certain natural laws which indicate the form of their relationship.**

Now the physicist himself, who describes all this, is, in his own account, himself constructed of it. He is, in short, made of a conglomeration of the very particulars he describes, no more, no less, bound together by and obeying such general laws as he himself has managed to find and to record.

**Thus we cannot escape the fact that the world we know is constructed in order (and thus in such a way as to be able) to see itself. This is indeed amazing.** Not so much in view of what it sees, although this may appear fantastic enough, but in respect of the fact that it can see *at all*. But *in order* to do so, evidently it must first cut itself up into it least one state which sees, and it least one other state which is seen. In this severed and mutilated condition, whatever the sees is *only partially* itself. We may take it that the world undoubtedly is itself (i.e. is indistinct from itself), but, in

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<sup>34</sup> Heinz von Foerster Logical Structure of Environment and Its Internal Representation: BCL Report # 96; originally published in 1962 by the University of Illinois, Champaign-Urbana. *Cybernetics and Human Knowing*. Vol. 18, nos. 3-4, pp. 45-62: I hope you will forgive me if I open my remarks with an apparently unpopular confession: In contrast to the tenets of some self-appointed apostles of the glories of annihilation and destruction, **I believe that love, not hatred and mutual killing, is the mainspring of man's cultural and spiritual evolution.** Clearly you will not let me get away with such an outrageous assertion, without sufficient evidence to support my proposition. To this end permit me to translate this assertion into somewhat more scientific terms. This can be done most advantageously in terms of a fast developing, fascinating branch of mathematics, namely “game theory”. **It can be easily shown that a “coalition structure” is much stronger than a “competitive structure.”** My assertion that a coalition structure is stronger than a competitive structure refers to the fact that two elements jointly can do things which the two elements separately can never achieve. In other words, by joining, each element gets more out of the deal than if it remains single. As trivial examples of advantages of coalitions, may I point to man's social build up during historical time, his vigorous urbanization in recent centuries, and his extensive development of the means of mass communication.

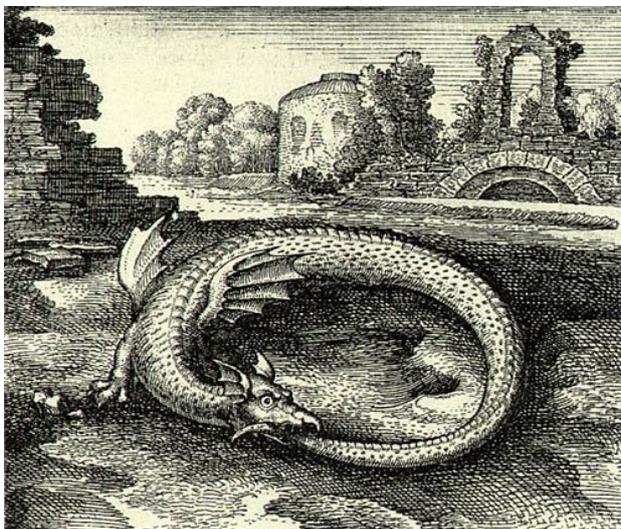
<sup>35</sup> Urs Boeschstein Beim Nachdenken über Sprache

any attempt to see itself as an object, it must equally undoubtedly, act\* (actor, antagonist). We may note the identity of action with agony.) so as to make itself distinct from, and therefore false to, itself. In this condition it will always partially elude itself.

**It seems hard to find an acceptable answer to the question of how or why the world conceives a desire, and discovers an ability, to see itself, and appears to suffer the process. That it does so is sometimes called the original mystery.** Perhaps, in view of *the form* in which we presently *take ourselves to exist*, the mystery *arises from* our insistence on *framing* a question where there is, in reality, *nothing* to question. However it may appear, if such desire, ability, and sufferance be granted, the state or condition that it arises as an outcome is, according to the laws here formulated, absolutely unavoidable. In this respect, at least, there is no mystery. We, as universal representatives, *can* record universal law far enough to say ...and so on, and so on you will eventually construct the universe, in every detail and potentiality, as you know it now; but then, again, what you will construct will not be all, for by the time you will have reached what now is, the universe will have expanded into a new order to contain what will then be. In this sense, in respect of its own information, the universe must expand to escape the telescopes through which we, who are it, are trying to capture it, which is us. The snake eats itself, the dog chases its tail.

My attempts to build my Weltbildhaus on a less rock-bottom-solid, secure foundation, to transform it into a float, led me into very strange realms of thought. What is my float floating on? What *is* before, behind, the *act* of the first distinction? What is the space of „being“? Is there a space of not-being? It was difficult to accept that all these „what“ questions are unanswerable. I can, as a living organism, only ask questions in a world of meaning which emerged in evolution long after the first act of distinction which marks the beginning of „life“. I am asking my questions in a world of „time“ and „space“, my thinking is somewhere and sometime. These dimensions are inventions of observation, of distinction and indication. Before observation there is no space, no time, there is no „being“, and there is no not-being. Is there „nothingness“? Is there „nothing“ - „no-thing“? What is „no-thing“? What is „not no-thing“? - no yes, no no, no is, no is not? Unanswerable questions?

I started my worldview-revision-story with Spencer Brown's „a the universe comes into being when a space is severed to or taken apart“, with the act of the first distinction, and the strange fact that „at this stage the universe cannot be distinguished from how we act upon it and the world may seem like shifting sand beneath our feet“. This led me to epistemological reflections on distinction and indication, observations and observers as principles of human knowing, of language and communication. My story so far, led me to an unresolvable, *original mystery*: the unobservable, the unmarked space and the unfathomable space of potentiality. And this leads me to an even stranger realm of thought – the world of formal abstraction, the world of mathematics, of „re-entry“, the world of self-referentiality, the snake biting its tail, the *uroboros*.



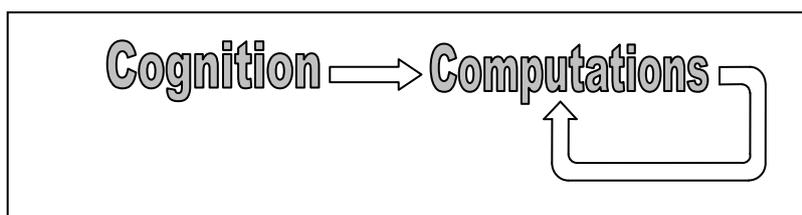
## Worldview-Revisions II The World of Circularity

„Although all forms, and thus all universes, are possible, and any particular form is mutable, it becomes evident that the laws relating such forms are the same in any universe. It is this sameness, **the idea that we can find a reality which is independent of how the universe actually appears**, that lends such fascination to the study of mathematics. That **mathematics**, in common with other art forms, **can lead us beyond ordinary existence**, and can show us something of **the structure in which all creation hangs together**...An initial exploration of such a world is usually undertaken in the company of an experienced guide. To undertake it alone, although possible, is perhaps as difficult as to set out on the first solo flight in an aeroplane with no other preparation than a study of the pilots' manual“.

George Spencer Brown<sup>36</sup>:

In the world of formal abstraction I am having problems. I am afraid of mathematics, I cannot read formulas, and I had no guide to help me understand that „mathematics, in common with other art forms, can lead us beyond ordinary existence, and can show us something of the structure in which all creation hangs together“. The world of formal calculation in which the snake eats itself, the abstract world in which „we can find a reality which is independent of how the universe actually appears“ remained for many years a closed space of thought. My brain refuses to understand abstract formulas and I had no guide to lead me through the jungle of abstractions and as a reader I set out on „the first solo flight in an aeroplane with no other preparation than a study of the pilots' manual“ and I crash-landed miserably because I did not even understand „the pilot's manual“ which was full of strange terms: „feedback“, „self-reference“, „recursive operations“, etc. How can I learn to understand the meaning of the words „recursion“ and „computation“?

Perhaps the most accessible and broadly disseminated rendering of von Foerster's insights into **recursive and neural computation** and what Maturana and Varela would soon call the „**organisational closure of autopoietic systems**“, is the 1973 paper „**On Constructing a Reality**“. It begins with a humorous and erudite literary allusion, then segues to a series of perceptual puzzles eliciting „**blind spots**“ in the sensorium before settling into its central argument regarding neuronal computation and the „double closure“ of cognitive systems. „On Constructing a Reality“ is a seminal announcement of **second-order cybernetics**, precisely as a **constructivist theory of cognition**. As one now says in the vocabulary of George Spencer Brown, „On Constructing a Reality“ **re-enters the form of cybernetic observation into its own form**. Von Foerster later coins the slogan „the observation of observation“, and „On Constructing a Reality“ prefigures the slogan with its logical derivation of **cognition as recursive computation**.



To shift epistemology to an **explicitly recursive system/environment paradigm** forces a cascade of repercussions. This cognitive regime bars any traditional form of empirical or realist representationalism, any simplistic notion of knowledge as the mechanics of linear inputs and outputs. **Redescribed as the production of an observing system, cognition is rendered as a contingent operational effect rather than assumed as a free-floating or even disembodied agency**. The boundary between „subject“ and „object“ is re-recognized as both an ongoing product of and an impassable limit to the operation of the system. **Computation** is generalised to mean any process or algorithm that transforms or recodes stimuli or data presented to it: „Computing ( from com- putare) literally means to reflect, to contemplate (putare) things in concert (com), without any explicit reference to numerical properties. Indeed, I shall use this term in this most general sense to indicate any operation (not necessarily numerical) that transforms, modifies, re-arranges, orders, and so on, observed physical entities (objects) or their representations (symbols)“. (Heinz von Foerster)

<sup>36</sup> George Spencer Brown Laws of Form, A note on the mathematical approach, pg. XXIX

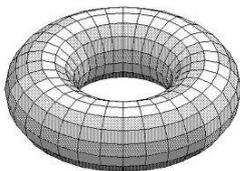
Using **recursion** as a skeleton key to unlock a range of **complex self-referential systems**, von Foerster's second order cybernetics arrived at the general discourse of **operational circularity** by turning cybernetic thinking upon itself. In second-order cybernetics von Foerster catalyzed new thinking about the deeper cognitive implications of **circular causality**.

Essentially, von Foerster tweaked the engineering discourse of **positive** and **negative feedback** towards the recognition of **self reference as a form of operation in systems in general**. With this second-order turn, matters of **circular form and operation** break out of philosophical and literary treatment (as reflexivity) and to scientific discussion (as recursion). Von Foerster's work renders **paradoxical propositions, recursive forms, and self-referential operations** available at once to rational and aesthetic, scientific and literary view. The crucial **conceptual shift** as a movement from first order cybernetics (homeostasis as a mode of autonomous self-regulation in mechanical and informatic systems) to **concepts of self-organisation** (the apparent self-ordering and self-regulation of bodies and minds) – and to **self reference and autology** - the abstract logical counterparts of **recursive operations** in systems“.

Bruce Clarke

This quote I found in an essay with the title „Von Foerster's Demons“<sup>37</sup>, that confronted me with terms like „circular causality“, „autology“, „recursive operation“ that were indeed *demons* beyond my understanding: What is the meaning of „feedback“, „self-reference“, „recursive operations“, etc.? What is wrong with my brain that I can still not fathom the language of „cognition as recursive computation“?

Michael Schiltz<sup>38</sup>: The presentation of **self-reference** in the calculus' notation, as Spencer-Brown demonstrates, is possible if and only if we are prepared to change the medium in which we are writing. Selfreference defies presentation in plane space, yet can be presented in topologically more intricate versions of space. That space is a **torus**.



Torus

If considered operationally, distinctions written on a torus can subvert (turn under) their boundaries, travel through the torus, and **re-enter the space they distinguish**, turning up in their own forms, thus capable of developing some kind of contact with themselves. Clearly, **such self-referential form cannot be decided** (Latin, *de-cedere*, „to cut off“) in the plane. The marked state cannot be clearly distinguished from the unmarked state anymore, leading to „indeterminacy“. The form is neither marked nor unmarked. It is an **imaginary value**<sup>39</sup>, flipping between marked and unmarked, thanks to the employment of *time*. However, this does not preclude its existence: The value [of self-referential forms] being indeterminate in space, may be called imaginary in relation with the form. Nevertheless it is real in relation with time and can, in relation with itself, become determinate in space, and thus real in the form. (Spencer-Brown, 1994 [1969]: 61) **Self-referentially operating systems** should thus be understood as **the operational difference between themselves and their environment**, a difference that is made through some sort of self-referential oscillating between the two sides of the distinction (i.e. system and environment).

<sup>37</sup> Bruce Clarke Heinz von Foerster's Demons, The Emergence of Second-Order Systems Theory in: Bruce Clarke and Mark Hansen Emergence and Embodiment Duke University Press 2009:

<sup>38</sup> Michael Schiltz Space is the Place The Laws of Form and Social Systems

<sup>39</sup> Felix Lau Die Form der Paradoxie Eine Einführung in die Mathematik und Philosophie der „Laws of Form“ ,Carl-Auer 2008: Der *re-entry* und der imaginäre Wert: Die paradoxe, von der einen auf die andere Seite der Unterscheidung verweisende Situation, wie sie die Oszillatorfunktion darstellt, kann mit den Mitteln, die der Kalkül mit den Gleichungen ersten Grades bereitstellt, nicht gelöst werden. Weder ist eine der Seiten die Lösung noch beide oder keine. Deshalb wird ein völlig neues Konzept eingeführt, ein Konzept, das die paradoxe Situation in ein Nacheinander der Zustände auflöst. In einer endlosen Oszillation wechselt die Markierung zwischen den beiden Zuständen oder Werten. Weil der Vorgang ohne Ende verläuft, setzt er sich *zeitlos* fort. Auf der einen Seite generiert er also Zeit, weil der *imaginäre Zustand der Form* nicht im Raum lösbar ist, auf der anderen Seite tilgt er den Unterschied, den Zeit macht, da sich für ihn nie ändert, dass er sich stets verändert, und er wird zeitlos. Unendlichkeit und Zeitlosigkeit entstehen zugleich als die Seiten der Grenze Zeit.

But here again, my brain refuses to understand, it shuts down and leaves me in a void. Trying to reread such passages again and again is no help, I am incapable to comprehend. I seem to be a mathematical dyslexic and I seem to have suffered from this predicament ever since I was a child. The book in which I had *consciously* encountered this understanding-problem for the first time - Gregory Bateson's „Mind and Nature“ A necessary Unity – required „re-reading“ many times and even after many repetitions, I was still far from understanding the new way of thinking and its new vocabulary.

„All description, explanation, all representation is necessarily in some sense a mapping of derivatives from the phenomena to be described onto some surface or matrix or system of coordinates. In the case of an actual map, the receiving matrix is commonly a flat sheet of paper of finite extent, and difficulties occur when that which is mapped is too big, or, for example, spherical. Other difficulties would be generated if the receiving matrix were the surface of a torus or if it were a discontinuous lineal sequence of points. Every receiving matrix, even a language or tautological network of propositions, will have its formal characteristics which will in principle be distorted of the phenomena to be mapped onto it“.

Gregory Bateson

Bateson's book had been my constant companion for many years. I tried to fathom Bateson's „revolutionary“ evolutionary ideas in vain, I tried underlining passages, scribbling marginals, and copying excerpts onto my first computer in the Eighties<sup>40</sup>. There are many such „marked“ book-tools in my library. Of „Mind and Nature - a necessary Unity“, there are three *used* tomes. When I started to work on my worldview-revision-story, I ordered a new one from Amazon. This time my brain seemed to read differently, it „marked“ automatically:

**Number is different from quantity:** this difference is basic for any sort of theorising in behavioural science, for any sort of imagining of what goes on between organisms or inside organisms as part of their processes of thought. Numbers are the product of counting. Quantities of the product of measurement. This means that numbers can conceivably be accurate because there is a discontinuity between each integer and the next. Between two and three, there is a jump. In the case of quantity, there is no such jump; and because jump is missing in the world of quantity, it is impossible for any quantity to be exact. You can have exactly three tomatoes. You can never have exactly three gallons of water. Always quantity is approximate. Not all numbers are the product of counting. Indeed, it is the smaller, therefore, commoner numbers that are often not counted but recognised as pattern at the single glance. In other words, number is of the world of pattern, gestalt, and digital computation; quantity is of a world of analogic and probabilistic computation

Gregory Bateson

While reading and trying to understand „the difference between numbers and quantity“ and „the difference between digital and analog computation“, a sad tale of my early years emerged from my „repressed“ subconscious. I relived a traumatic childhood memory that gave me a little insight into the history of my „Angst“ concerning all things „formal“.

*Once upon a time, many, many years ago, my father who was a primary school teacher was horrified to find out that his six-year-old son was not able to count. He realised that he had a very stupid son, because little me had refused to go to kindergarten (and pretended to be ill) three times in three months. When this happened again thirty days later, my mother became suspicious and made me confess, why I did not want to go to kindergarten and why I had to be ill on that particular day. I had my good reasons. The day at kindergarten started with counting. Thirty children were sitting on benches along the four walls of the classroom and every morning one of the children had to count all the children present. On the day when it would be my turn to count I had to be ill because I could not count. I didn't want to count. In my world 1, 2, 3, was enough. Exact numbers were not part of my world. For me counting was not a necessary skill. But then my horrified father made me get up an hour early next morning and go to school with him. Along that way there was a fence, a row of nine small sticks and a big stick reiterated. There I learnt to count, from one to ten, from 10 to 100, from 10<sup>2</sup> to 10<sup>3</sup> to 10<sup>4</sup>. I learnt very quickly. My father didn't believe me and repeated his teaching next morning. It took me five early morning walks to convince him that now I could count.*

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<sup>40</sup> Gregory Bateson: <http://www.uboeschenstein.ch/texte/bateson.html>

For seventy years I had been plagued with being exceedingly weak in mathematics. I never trusted my intellect and relied on feeling or intuition. For me math did not „lead beyond ordinary existence“ and did not „show something of the structure in which all creation hangs together“. But looking back over the years of my life, I now feel that my intuition did indeed allow me to *experience* the hidden structure that binds the universe into ONE. Now as an old man I realise that as a little boy I was a precocious daoist.

*The Dao produced One;  
One produced Two;  
Two produced Three;  
Three produced All things.*                      Laozi 42

Three produces all things and *all things* cannot be counted.

*All things leave behind them the Obscurity (out of which they have come), and go forward to embrace the Brightness (into which they have emerged), while they are harmonised by the Breath of Vacancy.*

The „breath of vacancy“ the little boy could not yet *think*, but he *knew*. He knew there was a difference between number and quantity. He also knew that there is an even deeper, more important difference, the distinction between „quantity“ and „quality“ behind the horizon. In the little boy's slowly developing worldview „*quality*“ was always the principle that guided learning processes. It allowed me in the course of many years to even develop some form of mathematical thinking – I slowly trained myself not to be afraid of „circularity“, to trust the creativity of all life, the self-organisation of life, the autonomy of life, the goal-seeking of all organisms. To be able to think in the space of this changing epistemology, I had to re-learn to count - not only forward, as my father had taught me, but backwards into the infinity of negative numbers and particularly into asking about that strange number in between - „zero“:

We start, then, with nothing, pure zero. But this is not the nothing of negation. For *not* means other than, and other is merely a synonym of the ordinal number second. As such it implies a first, while the present pure zero is prior to every first. The nothing of negation is the nothing of death, which comes second to, or after everything. But this **pure zero is the nothing of not having been born**. There is no individual thing, no compulsion, outward or inward, no law. It is the *germinal nothing*, in which the whole universe is involved or foreshadowed. As such, it is absolutely undefined and unlimited possibility – boundless possibility. There is no compulsion and no law. It is boundless freedom.

Ch.S. Peirce CP6.217

The boundless freedom of the *germinal nothing*, of pure zero – the absolutely undefined and unlimited boundless possibility – remains an unfathomable „zero-space“ beyond the reach of my understanding, beyond the potential of my imagination. Ranulph Glanville helped me greatly to come to grips with this problem. He tells of his experience learning to understand „architectural space“ as a space for thought<sup>41</sup>:

I never felt I understood architectural space, at least in a way which was not an intellectualisation but which related to my experience. And then I went to Mexico. Visiting the Mayan site of Palenque, I was propositioned by a man offering to be my guide. He was the local maths teacher, and what he said fitted exactly the interpretations of Spencer Brown I had been developing, showing the interpretations at work in the Mayan temples. Suddenly I had a way of coming to understand architectural space.

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<sup>41</sup> Ranulph Glanville A (Cybernetic) Musing: Architecture of Distinction and the Distinction of Architecture Cybernetics and Human Knowing. Vol. 17, no. 3, pp. 95-104: Architecture and Space for Thought, Glanville, 1988. This PhD recorded a sequence of experiments marked by their consistent failure. What I learnt from these experiments was that they provided no answers to the questions I was asking, although each directed me towards the next experiment. Rather, they taught me about common approaches that I learnt were alien to the way we understand space—about **inappropriate pre-suppositions**.

Here's what my guide did. He asked members of the small group I was in whether we understood **the mathematical concept of zero**. He pointed out that **zero is a number with unique qualities, being neither positive nor negative: it is the number between**.

**Zero marks the mathematical space between positive and negative numbers, but is not really a member of either: it creates class of its own with very peculiar behaviours.** We recognise this in our calculations of the number of years between a year on the positive side and one on the negative side. The number zero was invented in Meso- America by the Olmecs about 400 BC, contemporaneously with the (independent) Indian development of a similar concept of zero. Then my guide pointed to one of the openings in the front wall of the Temple of the Inscriptions, on top of the Great Pyramid. Walking up the gigantic steps of the pyramid, he asked **why the wall was so thick**. There is no structural reason to have a wall over a meter thick: structurally, the wall could have been much thinner. Getting no answer, he announced that **the wall itself was considered a space**. **The Maya had, he claimed, taken the wall to embody the number zero, with "positive" space inside and negative space outside**. Wanting us to understand this, the Maya made openings in the thick wall, a wall so thick that you had to step in the space within the wall, the opening—you could not step over it. Thus, you stepped into the space of the wall, **the "zero space," the space between inside and outside**. Thus, I began to understand **architectural space**, because I could at last see a **connection with the act of defining boundaries, edges and thresholds**—and in a manner which reflected my understanding of Spencer Brown's *Laws of Form*. I was enormously excited: for the first time, my two fields—cybernetics and architecture— came together in my understanding in a clear, explicit and experiential manner, and for some time afterwards I developed **the concept of zero space**.

Reading this I had a flash of insight. I suddenly *saw* that any space can be *imagined*, it can not be seen, but it can be thought. Zero is an infinite space and so is any boundary. Spencer Brown tells us: Draw a distinction! - and a universe will appear. So, we draw a line, or a circle, we separate a two dimensional space into an inside and an outside. We can now - in imagination - transform the boundary, the inbetween, from a two dimensional space into a many dimensional space. The Möbius-line of the distinction in a plane becomes a Möbius-space in which „Everything and Nothing are formally identical“.

The concept of *zero-space* allows me to imagine an infinite „*possibility space*“ that is both „infinite nothing“ and „infinite fullness“. In this possibility space „the identical form or definition or distinction acts as the boundary or description of the object as well as of what it is not“ – relations in the zero-space solve self-referential paradoxes. Canon-Zero<sup>42</sup> of Spencer Browns *Laws of Form* describes a „*creatio ex nihilo*“<sup>43</sup> as „*conditioned co-production*“<sup>44</sup> : „Everything and Nothing are formally identical“ – the opposing terms are co-produced. In every distinction we draw, we create two sides which „appear“ out of „nothingness“.

The complete text of the Laws can be reduced to a single principle that could be written down as follows“:

### **Canon Zero: Co-Production**

**What a thing is, and what it is not, is, in the Form, identically equal.**

This is to say, the identical form or definition or distinction acts as the boundary or description of the object as well as of what it is not. From this, it is easy to prove the corollary that **Everything and Nothing are formally identical** (proof: both are lacking any form whatsoever) .

<sup>42</sup> In my attempts to study Spencer Browns *Laws of Form* I have used three different editions, two in English (1994 and 2008) and one in German (1997). The term „*canon zero*“ only appears in the German translation. Dirk Kuhlmann helped me to translate it back to English.

<sup>43</sup> Niklas Luhmann: „Das „Nichts“ der *creatio ex nihilo* kann nicht in der Vergangenheit zurückbleiben. Es wird ständig benötigt, damit das Sein Sein sein kann. Die *creatio continua* erfordert eine ständige Neuschöpfung auch des Nichts“.

<sup>44</sup> Co-production: The other key insight that the Buddha had was that all things are conditioned. The idea that all things are conditioned is sometimes called the doctrine of **pratityasamutpada** or “Conditioned Co-production”.

Reflecting on relations and reference opened a space to think about mind, ideas and meaning. I had finally found a space in which I could „imagine“ a solution to my lifelong battle with **meaning**, with semantics, that talks of words having a content, words having meaning in themselves. That is utter non-sense, words have „sense“ only in context, in relation to other words. „Dans la langue il n'y a que des différences“ (Saussure). Meaning is about relationships, it is not about things, it is about ideas. (How do ideas emerge? Ideas like: living is cognition (Maturana), living is sense-making (Varela)). I can now reflect on a *possibility-space* where meaning is not yet fixed, not yet formed, a **medium** in which our indicating **forms** produce meaning out of „Nothingness“. The oppositions (antinomies<sup>45</sup>) which we create are in the form equal: „What a thing is, and what it is not, is, in the Form, identically equal“.

Any indication implies duality, we cannot produce a thing without coproducing what it is not, and **every duality implies triplicity**: what the thing is, what it isn't, and the boundary between them. Thus you cannot indicate anything without defining two states, and you cannot define two states without creating three elements. None of these exists in reality, or separately from the others. Spencer Brown

None of the three elements „exist in reality“. Dualities, which we take for real, depend on the third element, the boundary, the zero-space which is not really real. We cannot „think“ the One, the possibility space:

*„All things leave behind them the Obscurity (out of which they have come), and go forward to embrace the Brightness (into which they have emerged), while they are harmonised by the Breath of Vacancy“.*

The breath of vacancy, which Chinese thinkers called the „Dao“, is the „pneuma“ of meaning, the quality of Life. Out of this unobservable horizon, the zero-space, emerge the qualities of 1, 2, 3. This is what the little boy had „known“, when he refused to count. My problems with abstract mathematical thinking had its origin in the predilection of Western thought, the idea that reality is countable. I could never believe this, but it also took me seventy years of hard thinking to integrate my quality feeling into my „Weltbildhaus“.

My thinking about the quality of life started with reading books on Jung's Psychoanalysis. As a young man searching to integrate Carl Gustav Jung's term „Individuationsprozess“ into my everyday thinking, I failed miserably. The twentyfive year old student was unable to reflect on his „shadow“<sup>46</sup>. He was also unable to „understand“ the deep implications of Jung's ideas on an „Acausal Connecting Principle“<sup>47</sup>. Let me also admit that the „old me“ re-reading Jung's „Synchronicity“ is still unable to fathom it all, but the following passage I can *now* understand:

„The method best adapted to the nature of chance is the numerical method. Since the remotest times men have used numbers to establish meaningful coincidences, that is, coincidences that can be interpreted. There is something peculiar, one might even say mysterious, about numbers. They have never been entirely robbed of their numinous aura. If, so a textbook of mathematics tells us, a group of objects is deprived of every single one of its properties or characteristics there still remains, at the end, its number, which seems to indicate that **number is something irreducible**.“

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<sup>45</sup> Antinomy (Greek αντι-, for or instead of, plus νομος, law) literally means the mutual incompatibility, real or apparent, of two laws. It is a term used in logic and epistemology, particularly in the philosophy of Kant. This was part of Kant's critical program of determining limits to science and philosophical inquiry. These contradictions are inherent in reason when it is applied to the world as it is in itself, independently of our perceptions of it (this has to do with the distinction between phenomena and noumena).

<sup>46</sup> C.G. Jung: the shadow archetype - It took me many years to overcome my Angst to reflect on what deep down remained hidden. Now I „know“: I was afraid of not being good enough, God would never allow the bad boy to go to Heaven – I had been taught by my fundamentalist father. (vgl. footnote 8: ecclesio-genic neuroses)

<sup>47</sup> C.G. Jung Synchronicity An Acausal Connecting Principle, The Collected Works of C.G. Jung, Volume 8, Bollingen Series XX, Princeton University Press 1973

The sequence of natural numbers turns out to be unexpectedly more than the mere stringing together of identical units: it contains the whole of mathematics and everything yet to be discovered in this field. Number, therefore, is in one sense an unpredictable entity. The most elementary quality about an object is whether it is one or many. **Number helps more than anything else to bring order into the chaos of appearances. It is the predestined instrument for creating order, or for apprehending an already existing, but still unknown, regular rearrangement or "orderedness"**. It may well be the most primitive element of order in the human mind, seeing that the numbers 1 to 4 occurred with the greatest frequency and have the widest incidence. In other words, primitive patterns of order are mostly triads or tetrads. That numbers have an archetypal foundation is not, by the way, the conjecture of mine but of certain mathematicians. Hence it is not such an audacious conclusion after all if we define number psychologically as an archetype of order which has become conscious. It must be emphasised yet again that **they are not inventions of the conscious mind but spontaneous products of the unconscious**, as has been sufficiently shown by experience. Naturally the conscious mind can imitate these patterns of order, but such imitations do not prove that the originals are conscious inventions. From this it follows irrefutably that **the unconscious uses number as an ordering factor**. It is generally believed that numbers were invented or thought out by man, and therefore nothing but concepts of quantities, containing nothing that was not previously put into them by the human intellect. But it is equally possible that numbers were found or discovered. In that case **they are not only concepts but something more - autonomous entities which somehow contain more than just quantities.**

C.G.Jung Synchronicity, pg. 40

Reflecting on the phrase „*the unconscious uses number as an ordering factor*“ I started googling the term „synchronicity“ and found two authors who helped me integrate my „subconscious“ quality feeling with my „conscious“ attempts to redescribe my worldview. Robin Robertson The evolution of number Number as Archetype:

At this stage, man's sole conception of number and relationship was of the smaller integers, each of which possessed characteristic form and attributes, much as the gods themselves. Men knew of "one" or "two" or "three". They didn't yet know anything of "number" itself. The "natural" numbers, integers, counting numbers. These are all phrases for the simple whole numbers we know so well: one, two, three, four, five, and so forth. Jung discovered that these numbers - especially the smaller ones -were true symbols; that is, each was an endlessly inexhaustible metaphor. For example (and by no means is this intended to be exhaustive):

"one" is undifferentiated, unity, the point, by extension the circle;

"two" splits "one" apart, it demonstrates polarity, opposition, thesis and antithesis,

"three" is movement away from the stasis of opposition, the possibility of reconciliation between two polarities, the new synthesis contained within thesis and antithesis, the Christian trinity, a triangle;

"four" is stability, a constructed unity, the Christian trinity plus Mary, a square. Robin Robertson

Joseph Cambray Synchronicity Nature and Psyche in an Interconnected Universe

15 The notion of **the psychoid** was coined around 1907 by the biologist Hans Driesch; he used it as „the bases of instinctive phenomena“ in an idealistic sense; it is a nonphysical entity, the *potential* in the psyche with intensive, qualitative properties but without extension. Jung intends it as „quasi-psychic“ at the interface where the psychological and the material are undifferentiated and capable of reaching consciousness as such; it operates prior to any Cartesian-like separation of mind and body, rather like an aspect of the unus mundus of alchemy, the unitary world at the fundament of our world. Curiously, some cosmologies of the premodern era, such as the alchemical one parallel that of subatomic physics with **an original stage prior to any differentiation of substances**. They present a world of relations rather than objects, that is, attending to the interconnectedness of all things, where interactive processes appear more fundamental than discrete particles. 20 It is as if at the deepest level he is finding a place for the psyche at the origins of the universe through **the psychoid archetype**. This is not an intelligent design argument but an indication that the universe is as permeated with psyche as it is with space, time, and matter; that synchronicities provide traces of an original undifferentiated state. In such a cosmogony I suggest Jung is leading us to see psyche as another of the potentials inherent in the singularity. As the universe expands from the primordial singularity and cools, matter is separated from energy yet can interact with it (for example, as radiation) and space-time emerges; patterns begin to take shape and become substantial, first in the form of particles, which make up matter, then with greater cooling and expansion into clouds, which becomes stellar and galactic nurseries from which eventually the patterns that lead to life emerge and so on to consciousness, that is, **patterns with the potential to form psyche and hold meaning.**

Re-reading „Synchronicity“ I chanced upon an important hint: „there is some possibility of getting rid of the incommensurability between the observed and the Observer. The result, in that case, would be a unity of being which would have to be expressed in terms of **a new conceptual language**“.<sup>48</sup>

*„All things leave behind them the Obscurity (out of which they have come), and go forward to embrace the Brightness (into which they have emerged), while they are harmonised by the Breath of Vacancy“.*

Laozi 42

Attempting to translate the „conceptual language“ of an „old“ Chinese vocabulary into „new“ terms that scientific thinking developed in the past three hundred years<sup>49</sup> confronted me with a deep problem:

„It is generally believed that numbers were invented or thought out by man, and therefore nothing but concepts of quantities, containing nothing that was not previously put into them by the human intellect. But it is equally possible that numbers were found or discovered. In that case **they are not only concepts but something more - autonomous entities which somehow contain more than just quantities.**“

C.G. Jung

Are there „really“ *autonomous entities* that an observer observing from outside can observe? The history of my Weltbild constructions over the past seventy years is concerned with a paradigm shift from ontological thinking (with its „Leitunterscheidung“ being/not being) to how I learnt to use Luhmann's Leitunterscheidung System/Umwelt.

## Strange Transformations - Earth, Water, Air, and Fire.

My Weltbild-House had been a very real structure grounded on a firm foundation for forty years. I never questioned my basic realistic, ontological assumptions.

*„In the first place, we see that what we just now called **water**, by condensation, I suppose, becomes stone and **earth**; and this same element, when melted and dispersed, passes into vapour and **air**. Air, again, when inflamed, becomes **fire**; and again fire, when condensed and extinguished, passes once more into the form of air; and once more, air, when collected and condensed, produces cloud and mist; and from these, when still more compressed, comes flowing water, and from water comes earth and stones once more; and thus **generation appears to be transmitted from one to the other in a circle**“.*

Plato Timaeus

I remember reading Teilhard de Chardin many years ago, his discription of the many spheres of his Weltbild:

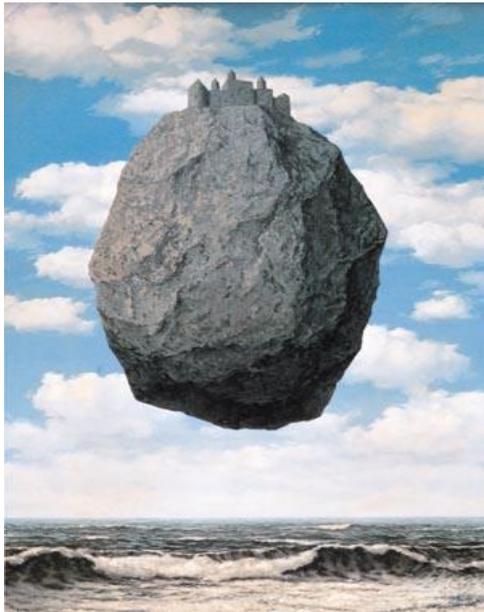
Geologists have long agreed in admitting the zonal composition of our planet. We have already spoken of the **barysphere**, central and metallic, surrounded by the rocky **lithosphere** that in turn is surrounded by the fluid layers of the **hydrosphere** and the **atmosphere**. Science has rightly become accustomed to add another to these four concentric layers, the living membrane composed of the fauna and flora of the globe, the **biosphere**, an envelope as definitely universal as the other „spheres“ and even more definitely individualised than them. The recognition and isolation of a new era of evolution, the era of noogenesis, obliges us to distinguish yet another membrane in the majestic assembly of telluric layers. Outside and above the biosphere there is the **noosphere**<sup>50</sup>.

<sup>48</sup> C.G.Jung Synchronicity pg.96: Synchronicity is not a philosophical view but an empirical concept which postulates an intellectually necessary principle. This cannot be called either materialism or metaphysics. No serious investigator would assert that the nature of what is observed to exist, and of that which observes, namely the psyche, are known and recognised quantities. If the latest conclusions of science are coming nearer and nearer to a unitary idea of being, characterised by space and time on the one hand and by causality and synchronicity on the other, that has nothing to do with materialism. Rather it seems to show that there is some possibility of getting rid of the incommensurability between the observed and the Observer. The result, in that case, would be a unity of being which would have to be expressed in terms of a new conceptual language....

<sup>49</sup> a new conceptual language: Difference-Theory (**GSB**) , Systemstheory (**Luhmann, Fuchs**)

<sup>50</sup> Pierre Teilhard de Chardin The Phenomenon of Man Collins Sons&Co.,Ltd. 1959, pg. 182

I could integrate five of these spheres into my solid ontological worldview but I could not imagine the noosphere. I felt uneasy with that mystical sphere of the spirit. The term „noosphere“ was not part of my vocabulary. Even after that strange moment at the end of the world that suddenly transformed my worldviewhouse into of **worldview float**, the transformation from Earth to Water, Teilhard’s spiritualism was anathema. For the past almost thirty years years, all those years that I had been reading so many books on questions of how to live and how to think, I still walk on firm ground every day and still float on a vast sea of opportunities to evaluate my everyday decisions. But now, trying to integrate abstract thinking, my floating worldview slowly transformed itself into a „**flying castle**“ that allows me to fly freely in the Air of my reflections.



**René Magritte Le château des pyrénées**

„When I think of theoretical physics I do not see an edifice resting on square foundations on the ground but a structure closed on itself like the castle of Magritte’s painting. The rock supports the castle, but the castle holds the rock and lifts it to a higher level. A mysterious power keeps it suspended above the waves of the ocean: it is the power of internal consistency“.

Giovanni Vignale

How can I learn to reflect on „the power of internal consistency“?<sup>51</sup> Is it „absolutely undefined and unlimited possibility - boundless possibility“ as Peirce suggests? Is it the infinite space of „nothingness“, the world of unlimited potentiality? Is it the world of „chance“, the world „before, beyond „order“ that no human language can grasp? Is the „mysterious power“ that keeps our thinking „suspended above the waves of the ocean“ pure theory? Might it be that „the power of internal consistency“ with which living organisms build their „châteaux d’Espagne“, their „Luftschlösser“, above the waves of unordered chaos comparable to what Gregory Bateson in *Mind and Nature* names „the pattern which connects“<sup>52</sup>?

„My questions concern the underlying notion of a dividing line between the world of the living (where *distinctions* are drawn and *difference* can be a cause) and the world of nonliving billiard balls and galaxies (where forces and impacts are the „causes“ of events). These are the two worlds that Jung (following the Gnostics in his „Septem Sermones ad Mortuos, 1916)) calls *creatura* (the living) and *pleroma* (the nonliving). What is the difference between the physical world of pleroma, where forces and impact to provide a sufficient bases of explanation, and the creatura, where nothing can be understood until *differences* and *distinctions* are invoked? In my life, I have put the discriptions of sticks and stones and billiard balls and galaxies in one box, the pleroma, and have left them alone.

<sup>51</sup> Giovanni Vignale *The Beautifull Invisible*, Oxford 2011

<sup>52</sup> Gregory Bateson *Mind and Nature A Necessary Unity*. pg. 9f.

In the other box, I put living things: crabs, people, problems of beauty, and problems of difference. I offer you the phrase *the pattern which connects* as a synonym, an other possible title for this book. ***The pattern which connects***.  
Gregory Bateson

I assume that „the pattern which connects“can be identified with what quantum physicists call **information**: „The universe builds itself from bits“. „Information matters“, writes Paul Davies in his book „From Physics to Metaphysics“<sup>53</sup>.

„In the light of modern physics, apparently solid matter is revealed, on closer inspection, to be almost all empty space, and the particles of which matter is composed are themselves ghostly patterns of quantum energy, mere expectations of invisible quantum fields, or possibly vibrating loops of strings living in a ten-dimensional space-time. The history of physics is one of successive abstractions from daily experience and common sense, into **a counterintuitive realm of mathematical forms and relationships**, with a link to the stark sense data of human observation that is long and often tortuous. Yet at the end of the day, science is empirical, and our finest theories must be grounded, somehow, „in reality“. But what is reality? Is it in the acts of observation of the world made by human and possibly nonhuman observers? In some objective world „out there“? Or in a more abstract location?“

In the past few years – the years I had the chance to live in the twentyfirst century – I found an answer to George Spencer Brown’s „amazing original mystery“:

**Thus we cannot escape the fact that the world we know is constructed in order (and thus in such a way as to be able) to see itself. This is indeed amazing.** Not so much in view of what it sees, although this may appear fantastic enough, but in respect of the fact that it can see *at all*. But *in order* to do so, evidently it must first cut itself up into it least one state which sees, and it least one other state which is seen. In this severed and mutilated condition, whatever the sees is *only partially* itself. We may take it that the world undoubtedly is itself (i.e. is indistinct from itself), but, in any attempt to see itself as an object, it must equally undoubtedly, act\* (actor, antagonist). We may note the identity of action with agony.) so as to make itself distinct from, and therefore false to, itself. In this condition it will always partially elude itself. **It seems hard to find an acceptable answer to the question of how or why the world conceives a desire, and discovers an ability, to see itself, and appears to suffer the process. That it does so is sometimes called the original mystery.**

George Spencer Brown

The universe is indeed constructed to see itself. The computational universe „conceived desire“, desire to persist, to survive, it invented life and a series of information-processing revolutions – worlds of meaning that are invisible – „*The Beautiful Invisible*“ as Giovanni Vignale explains:

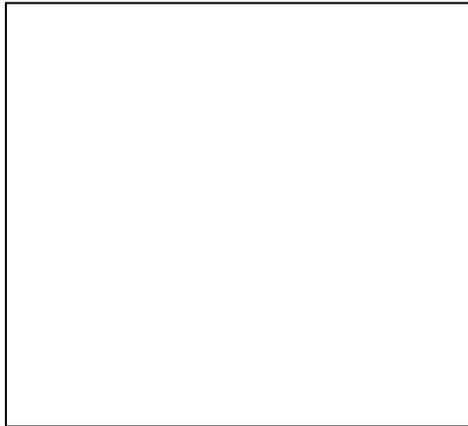
There is a story called *The Little Prince* by the French writer Antoine de Saint-Exupéry that I find deeply inspiring. A pilot crash-lands in a desert and meets himself, thinly disguised as a young boy (the eponymous little prince) from another planet. The pilot had been a gifted child artist but had lost faith when he drew a long shape with a central hump. The adults had seen it as a hat, never allowing that it could be what the child intended: a python that has swallowed an elephant. Following the little

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<sup>53</sup> Davies/Gregersen: Does information matter? In: Information and the Nature of Reality, From Physics to Metaphysics, ed. Paul Davies/Niels Gregersen Oxford 2010: Inherited notions of matter and the material world have not been able to sustain the evolutionary development of 20th century physics and biology. For centuries Isaac Newton's idea of matter as consisting of „solid, massy, hard, impenetrable, and immovable particles“ reigned in combination with a strong view of laws of nature that were supposed to prescribe exactly, on the basis of the present physical situation, what was going to happen in the future. This complex of scientific materialism and mechanism was easily amalgamated with commonsense assumptions of solid matter as the bedrock of all reality. Complex systems such as living organisms, societies, and human persons, could, according to this reductionist worldview, ultimately be explained in terms of material components and their chemical interactions. However, the emergence of thermodynamics began to cast doubt on the universal scope of determinism. It was not until the 20th century, however, that the importance of non-equilibrium dissipative structures in thermodynamics led scientists (Ilya Prigogine) to formulate a more general attack on the assumptions of reversibility and scientific determinism. Three new developments of 20th century physics in particular force the downfall of the inherited Matter Myth, and lead to new explorations of the seminal role of information in physical reality: Einstein's theory of general relativity, quantum theory (which describes a fundamental level of reality), and information. <http://www.uboeschenstein.ch/texte/Davies-Metaphysics1.html>

prince through various strange encounters, we eventually learn that "whether it's a house, or the stars, or the desert, what makes them beautiful is invisible". This quote struck me as a good introduction to my favourite science, theoretical physics - and as an explanation of the rather obscure-sounding title of my book, *The Beautiful Invisible*, on which this essay is based. For a long time I had wanted to write a book on the unique nature of theoretical physics. Many people see science as dry number-crunching that manages to lose the hidden beauty of the world in what, nearly a century ago, the writer Robert Musil called "an orgy of matter-of-factness after centuries of theology". **Theoretical physics, however, emerges at the heart of physics as the modern science of the invisible, a modern form of theology.**

Giovanni Vignale<sup>54</sup>,



To integrate that „mysterious power“, the original mystery, I need to transform my worldview again, move from clear Air to creative Fire, to „theoretical physics (that) emerges at the heart of physics as the modern science of the invisible, a modern form of theology“. My 2012 Weltbildhaus is „pictured“ above: empty space, nothing!

I live in a **world of meaning**, a **world of information**, a „computational universe“ as it is called by Seth Lloyd<sup>55</sup>:

**The computational universe:** We are in the midst of an **information-processing revolution** based on electronic computers and optical communication systems. This revolution has transformed work, education, and thought, and has affected the life of every person on earth. The effect of the **digital revolution** on humanity as a whole, however, pales when compared with the effect of the previous information-processing revolution: the invention of movable type. The invention of the **printing press** was an information-processing revolution of the first magnitude. Similarly, the effect of the printed word is small when compared with the effect of **the written word**. Writing - the discovery that spoken words could be put into correspondence with marks on clay, stone, or paper - was a huge information-processing revolution. The existence of complicated, hierarchical societies with extended division of labour depends crucially on writing. Just as printing is based on writing, writing stems from one of the greatest information-processing revolutions in the history of our planet: **the development of the spoken word**. Human language is a remarkable form of information-processing, capable of expressing, well, anything that can be put into words. Human language includes within it the capacity to perform sophisticated analysis, such as mathematics and logic, as well as the personal calculations that underlie the complexity of human society.

**The mother of all information-processing revolutions is life itself.** However it came about, the mechanism of storing genetic information in DNA, and reproducing the variation, is a truly remarkable invention that gave rise to the beautiful and rich world around us. Life is the original information-processing revolution. Or is it?

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<sup>54</sup> Giovanni Vignale *The Beautiful Invisible, Creativity, Imagination, and Theoretical Physics*, Oxford University Press, 2011

<sup>55</sup> Seth Lloyd *The Informational Universe: Information and the Nature of Reality, From Physics to Metaphysics*, ed. Paul Davies/Niels Gregersen Oxford 2010

Life arose on Earth sometime in the last five billion years. Meanwhile, the universe itself is a little less than fourteen billion years old. Were the intervening nine billion years completely devoid of information-processing revolutions? The answer to this question is „No“. Life is not the original information-processing revolution. **The very first information-processing revolution, from which all other revolution stem, began with the beginning of the universe itself.** The big bang at the beginning of time consisted of huge numbers of elementary particles, colliding at temperatures of billions of degrees. Each of these particles carried with it bits of information, and every time two particles bounced off each other, those bits were transformed and processed. **The big bang was a bit bang.** Starting from its very earliest moments, every piece of the universe was processing information. The universe computes. It is this ongoing computation of the universe itself that gave rise naturally to subsequent information-processing revolutions such as life, sex, brains, language, and electronic computers. **The mother of all information-processing revolution is life itself.** However it came about, the mechanism of storing genetic information in DNA, and reproducing the variation, is a truly remarkable invention that gave rise to the beautiful and rich world around us. **Life is the original information-processing revolution.**  
Seth Lloyd

Out of this original information-processing revolution the universe – our mother - developed forms of interaction among living cells that led to multicellular organisms who became individuals, who needed brains that can decide, nervous systems that can store information, networks of neurons that are mind:

**We are the mind of the biosphere**, the solar system, and - who can say? - Perhaps the galaxy. Looking about us, we have learned to translate into our narrow audiovisual systems the sensory modalities of other organisms. We know much of the physiochemical basis of our biology. We will soon create simple organisms in the laboratory. We have learned the history of the universe and look out almost to its edge. Our ancestors were one of only two dozen or so animal lines to evolve **eusociality**<sup>56</sup>, the next major level of biological organisation above the organismic. There, group members across two or more generations stayed together, cooperate, care for the young, and divide labour in a way favouring reproduction. In time they hit upon the **symbol-based language**, and literacy, and science-based technology that give us the edge over the rest of life<sup>57</sup>.  
Edward O. Wilson

My next chapter will be build it on the strange idea that I came across many years ago reading Teilhard de Chardin, the **noosphere**, which for me became the **world of meaning**, the **medium of sense**. It will be a transformed worldview in the „element of creative Fire“, the world of strange loops that Douglas Hofstadter<sup>58</sup> introduced in „I am a strange loop“:

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<sup>56</sup> **Eusociality** (Greek *eu*: "good/real" + "social") is a term used for the highest level of social organization in a hierarchical classification. The lower levels of social organization, presociality, were classified using different terms, including presocial, subsocial, semisocial, parasocial and quasisocial.

<sup>57</sup> Edward O. Wilson *The Social Conquest of Earth* W.W.Norton, 2012, 288.

<sup>58</sup> Douglas Hofstadter „I am a Strange Loop“, Perseus Books, 2007

## Worldview-Revisions III The Worlds of Meaning

„You and I are mirages who perceive themselves, and the sole magical machinery behind the scenes is perception - the triggering, by huge flows of raw data, of **a tiny set of symbols that stand for abstract regularities in the world**. When perception at arbitrarily high levels of abstraction enters the world of physics and **when feedback loops galore come into play, then „which“ eventually turns into „who“**.

What would once have been labelled „mechanical“ and reflexively discarded as candidate for consciousness has to be considered. We human beings are macroscopic structures in the universe whose laws reside at a microscopic level. **As survival-seeking beings, we are driven to seek efficient explanations that make reference only to entities at our own level.**

We therefore draw conceptual boundaries around entities that we easily perceive, and in so doing we carve out what seems to us to be reality.

**The „I“ we create for each of us is a quintessential example of such a perceived or invented reality**, and it does such a good job of explaining our behaviour that it becomes the hub around which the rest of the world seems to rotate. But this „I“ notion is just a shorthand for a vast mass of seething and churning of which we are unnecessarily unaware. But our own unfathomability is a lucky thing for us! We live in a state of blessed ignorance, but it is also a state of marvellous enlightenment, for it involves **floating in a universe of mid-level categories of our own creation** - categories that function incredibly well as survival enhancers. In the end, **we self-perceiving, self-inventing, locked-in mirages are little-miracles of self-reference.**

Our very nature is such as to prevent us from fully understanding its very nature. Poised midway between the unvisualizable cosmic vastness of curved space-time and the dubious, shadowy flickerings of charged quanta, we human beings, more like rainbows and mirages than like raindrops or boulders, are unpredictable self-writing poems - vague, metaphorical, ambiguous, and sometimes exceedingly beautiful“.

Douglas Hofstadter

Bleuler: Philosophiegeschichte: wie konnte wann gedacht werden?

<http://www.uboeschenstein.ch/texte/deacon-IncompleteNature.html>

Peter Fuchs Das Sinnsystem Prospekt einer allgemeinen Theorie