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SOCIAL SYSTEMS AND THE FUTURE (THE TENTH FUSCHL CONVERSATION)

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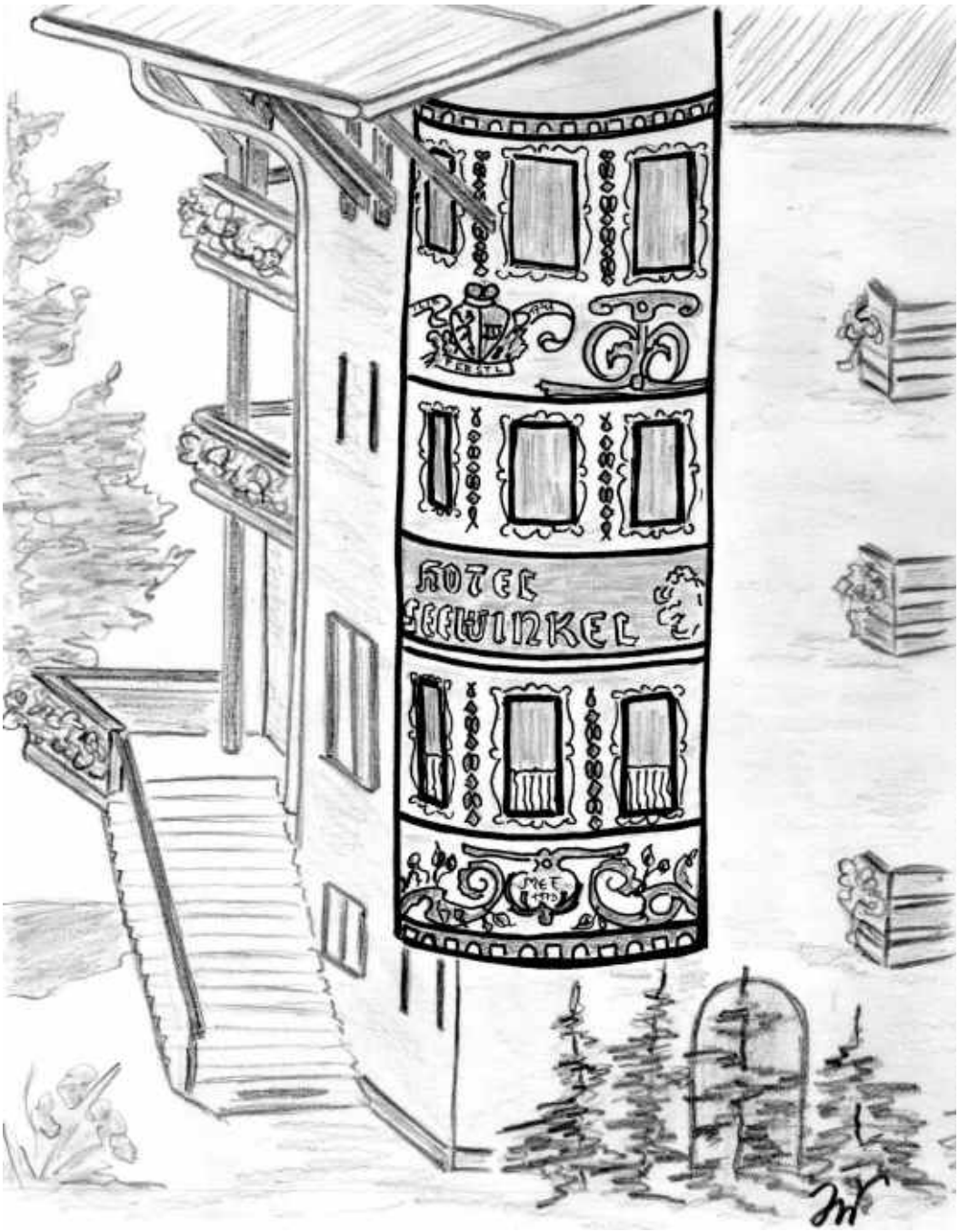
HOTEL
SEEWINKEL

Fuschl 2000

The 10th anniversary of the Fuschl Conversations

It was our pleasure to welcome a distinguished group of systems thinkers on a beautiful, sunny Sunday afternoon in lovely Fuschl at the Lake Fuschl.

Numbers bear a certain fascination to all of us – and this year it was the 10th anniversary of the Fuschl talks. The initial Conversation took place in 1980 in the same hotel we are still in today. Additionally everybody was still fascinated by the impression that the year 2000 was to be something very special. Years with such round numbers make one look back, partly with some sadness, partly with some feeling of accomplishment. But more strongly we tend to look into the future more intensively. And many of us had the feeling that this conversation had a broader, a wider horizon.

But there we a few sad feelings too:

We missed Bela H. Banathy so much. He was the spiritus rector of all the Fuschl Conversations, established the idea and spread it to other locations, but still calling all these Conversations 'Fuschl Conversations'. Similarly we had to realize that Sue McCormick could not attend for health reasons, forcing us to cancel one discussion team. By bad luck Bela's son, Bela A. Banathy also had to cancel his attendance handing the lead of his team over to Soeren Brier.

And there were no Ferstls! Albert and Johanna had handed the management of their hotel over to Fam. Hofmann. The new hosts did an excellent job and made our stay most pleasant - but a bit of what we expected to find in Fuschl had to be categorized under the heading of 'memory'.

It turned out that we had less participants this year, only 21. It made the distribution of the groups easier – but ironically there was no necessity since we could stay outside most of the day. And we had better and more sophisticated equipment and better technical support thanks to Christian Hofer. The daily feed-back meetings were appreciated and considered an improvement.

Looking back we both want to thank all stewards of the Fuschl Conversation, lead by Gordon Dyer, who took the leadership of the Conversation. For his own team he picked the very challenging issue of the year 3000 and how one would like the world to look then.

Gary Metcalf's team chose an initially rather neutral topic 'Awareness and Social Systems'. In the view of the results of the elections in Austria in January 2000 (Haider's Freedom Party entering into a coalition government and the subsequent sanctions by the European Union members) this topic suddenly gained high interest and actuality and gave raise to heated discussions.

For the team on 'Foundations of Information Science' Soeren Brier had to step in for Bela A. Banathy. The team really went back to the very basics on which we build our understanding of what information is.

Arne Collen's team concerned itself with 'Designing Systems for Human Betterment' and continued the discussion of the Fuschl Conversation 1998.

During the whole week we enjoyed beautiful weather. We were granted with a beautiful view of the lake and the surrounding mountains. There the snow gradually receded, giving way to spring.

We also enjoyed ourselves in the evenings: we had a singing evening where Günther and Gerhard offered some pseudo-multilingual songs.

We all gained valuable insights to take home and to spread them to those who were not so lucky as to be able to join the discussions in Fuschl.

We would also like to thank the IFSR for sponsoring the Fuschl Conversations and the Austrian Government for supporting this event, too.

Finally we would like to close by the now two-year old remark of Charles Francois:

"When you go home, you are a different person!"

Gerhard Chroust Christian Hofer

Welcome!

Bela H. Banathy

Greetings! It is hard to put in words the distress I feel that I cannot be with you to celebrate our tenth conversation. I hoped to share the opportunity to reflect upon what we have achieved and create ideas and plans for the future. (I already had my ticket which I had to cancel. Our lives are guided by priorities and Eva's health and being her care-giver is my top priority.) She joins me in sending our warmest greetings to all of you, wishing you all success. We also send our warm wishes to our great hosts Joanna and Albert.

The future of Fuschl. In preparation for the 10th Conversation we - the Executive Committee of IFSR - spent a good deal of time at our last meeting on the question: How can Fuschl best serve the systems community? I planned to have a conversation with you about this.

We suggest that future conversations should address at least four essential issues:

(1) Systems Education which creates the future of the systems movement; without it we cannot even survive, less prosper.

(2) Applying the insights we have gained from systems science to human betterment and to the service of our global human community.

(3) Humanistic information science and knowledge development as a response to the running away technology and the emerging vision of a "cyborg society."

(4) East and West: the integration of their theories of life and systems: an emerging vision of a civil society.

I hope you consider these topics and have a conversation on your response to them.

The program described here is not a prescription but a description of a way that we believe that we can serve members of the Federation as well as the larger systems community.

The Agora Project:
A Comprehensive Definition

Bela H. Banathy

Here I introduce to you a project idea to which I wish to devote myself with several ISI and Fuschl friends. The idea developed as I worked on and now finishes by new book: "(Self)Guided Societal Evolution: A Systems View." (Published by Kluwer Scientific/Plenum Publisher later this year).

In Part One, we place the project in the context of the evolutionary journey of our species, showing that we have reached the stage when we are called upon to guide our own evolution. In Part Two we explore ways and means by which we can accept the challenge of conscious, self-guided evolution. In Part Three, we present a first definition of the Agora project. In Part Four, the Agora challenge is introduced.

Part One: The Evolutionary Context

The evolutionary journey of our species has been marked by three seminal events. The first happened some seven million yeas ago, when our humanoid ancestors silently entered on the evolutionary scene. Their journey toward the second crucial event took over ix million years when -- as the greatest event of our evolutionary journey -- Homo Sapiens Sapiens emerged and started the revolutionary process of cultural evolution. Today, we have arrived at the threshold of the second revolution: the "revolution of conscious evolution," when it becomes our responsibility to enter into the evolutionary design space and guide the evolutionary journey of our species. While during six million years our journey was a slow process of primarily biological evolution, driven by natural selection. With the human revolution some fifty thousand years ago, with the emergence of self-reflective consciousness, the evolutionary process transformed from biological to cultural.

Out of Eden: The First Time Around

Who am I? Where am I? Who are you? Why are we here? These are some of the existential questions human beings have asked since they have moved out from the blissful state of undifferentiated subconsciousness of "oneness with nature" and "oneness with wholeness." Using the biblical metaphor, having eaten from the tree of knowledge, these were the same questions Eva and Adam asked as they found themselves out of Eden, having lost "innocence," they faced the harsh reality that they had to make decision about their existence.

At the dawn of consciousness, Homo Sapiens Sapiens took the first step into the world of self-reflection about the "I and thou," "we and others," and "we and nature." This separation from nature and from "oneness with wholeness" marked the critical point of transcending "biological evolution" and entering the path of "cultural evolution." After dozing for millions of years in the dreamless state of pre-consciousness, we awakened into the sunlight of humanness and discovered that we

became responsible for our existence. Stepping through the threshold of consciousness marks the true miracle of the evolutionary story.

During the next forty thousand years during evolutionary journey we saw the emergence and decline of three Evolutionary Generations of Homo Sapiens Sapiens (HSS). The first Generation of humans, the Cro-Magnons, the Magician Artist, prospered for some 30kyrs. Then, some 10kyrs ago, the agricultural revolution of the Second Generation brought forth the age of the farmers of the agricultural villages; the priests, the rules, the tradesmen, the artisans, the engineers of the ancient civilizations; followed by the philosophers of the Greek City States, where democracy was born. The Second Generation of HSS saw the emergence of the great spiritual traditions. Then, some four hundred years ago, with the scientific/industrial revolution the Third Generation of HSS emerged. Now we stand are at the threshold of the emergence of the Fourth Generation. (The story of the evolutionary journey, compressed in a nutshell, is elaborated in Guided Evolution of Society: A Systems View. (Kluwer Academic/Plenum Publishing, 2000, in press.)

Part Two: The Evolutionary Challenge

With the emergence of evolutionary science in the middle of the last century, we became increasingly conscious of evolution. The science of evolution became the container of much of what the science of life is about. The explosive knowledge base of evolutionary science is manifested in a host of disciplines and fields of study. We now know how evolution has worked in the evolutionary design space, how the various life forms of our species have been tested in that space. We now know how evolution has worked, what have been its operating principles. In one phrase, we have attained evolutionary consciousness. We now know not only that we know that we know, but also that we know how we have become.

Out of Eden: The Second Time Around

This is our Out of Eden the Second Time Around. While the previous generations were shaped by evolutionary forces in the evolutionary design space, we have again lost "the innocence of ignorance, " the innocence of not being responsible for designing our future. We now have the privilege and the burden of entering into the evolutionary design space of conscious evolution. Our knowing how we have become, our evolutionary consciousness provides us now the springboard of conscious purposeful evolution, marking the third crucial event of the evolution of our species: the revolution of conscious evolution: the emergence of the Fourth Generation of HSS. The focus of the Agora Project is to contemplate the unfolding of this crucial event and understand our crucial role in it. We are challenged to create our own Eden for the 21st Century.

Part Three: Agoras of the Twenty First Century

> *"Never doubt that a small group of thoughtful, committed citizens can change the world: Indeed, it's the only thing that ever does."*
>
> *Margaret Mead*

Throughout history the truly fundamental changes in the life of humankind have not happened by the decree of rulers and potentates, or by laws constructed by governments. If anything, their efforts focused on maintaining their power by preventing change, or making small incremental adjustments

if they absolutely had to. As Margaret Mead remarked, only small groups of thoughtful and committed people can change the world. Such has been the case in all the major faiths, spiritual movements, and the idea and value systems of humankind. So it will be now, as the Fourth Generation of HSS is emerging by the revolution of conscious evolution. (This part is adopted from the last chapter of Guided evolution of Society: A Systems View.).

The evolutionary quantum jump, the big change will happen in our myriad of communities, living and acting all over the evolutionary landscape. They will become the designers of conscious evolution. We have already left the darkness of the Third Generation and the new evolutionary landscape becomes visible in the emerging sunrise of the Fourth Generation. People are ready to reclaim their basic right to take part directly in decisions affecting their lives and taking responsibility for shaping their future. Starting with the family, groups of all kind; neighborhoods, the systems in which people live and work, communities of committed citizens everywhere who share interest and purpose are ready to enter into the evolutionary design space. Some of them are now engaged in conscious evolution, and will in ever larger numbers engage in building the civic societies of the Fourth Generation. Embarking on their evolutionary journey, they map out their evolutionary path as they search for and formulate an ideal evolutionary image that will guide them into the future. I call these evolutionary designing communities the "Agoras of the 21st Century.

The citizens of Athene gave us great gifts. The idea of democracy, practiced in the "public sphere of the Agora is the greatest of those gifts. It was the Agora where they brought democracy to life. This heritage inspires us as we embark on our evolutionary journey and aim to forge a way of life that will truly represent the democratic idea. We shall build evolutionary design communities and a society in which thousands and thousands of Agoras will bloom on the evolutionary landscape. These communities will keep our lives purposefully creative and focused and personally and collectively meaningful and rewarding. These New Agoras, the evolutionary design spheres of conscious evolution, will offer us the tangible and actionable functional contexts of self-guided evolution.

The Agoras: The Old and the New

The Agoras of classical Greece were the places of assembly in the city states. It was during sixth to the fourth centuries B.C., during the highlight of the Greek classical period, that democracy was established and flourished in the city state of Athene. It was practiced in the "public sphere" of Agora, a place of about 26 acres, declared as an open public space. It was surrounded with plane-trees which provided shade and gave the Agora a feeling of a country look .The citizens of Athene held forty statutory Assemblies a year on the Agora. These meetings provided the citizenry the opportunity to deliberate and make decisions about issues that affected their lives and the life of their community. The Agora proceedings were governed by the democratic constitution, which was established in 507 B.C. by the Athenians.. This constitutional arrangement brought the everyday citizen into a more active role in the service of the common good then any time before or since. Athenian democracy, thus, represents the widest possible diffusion of political power among its citizens, the widest ever practiced in human history.

The "Agora Concept" for the 21st Century. The Athenian Agora existed as a most inspiring manifestation of society's life during the Second Generation HSS. It was a shining moment in the history of the human experience. Hannah Arent holds that true democracy was lived only once, namely, as it was manifested in the life experiences of the Athenians. She suggests that it became possible only because the Athenians developed the concept and established the sphere of Agora,

where they were able to make collective decisions about issues, affecting their lives and their community. The Agora experience was a unique experience in the history of humankind. It became lost in the darkening and declining centuries of the life-cycle of the Second Generation.

Now, we can bring the Agora concept and experience back to life again. We have arrived at an evolutionary stage when we have acquired evolutionary consciousness, and -- as a consequence -- we have become responsible for guiding our own evolution. To exercise this responsibility, we are in search of public spheres, new Agoras, where we can not only (re)establish true democracy, but bring it alive as a shared culture a shred and lived democratic culture. We are challenged to reconstitute a method and procedure by which our institutions could act and establish arrangements by which we can govern ourselves: establish a cultural democracy. And, most significantly, the New Agoras can hold up for us democracy as both a guiding idea and a process by which to work in the evolutionary design space.

Part Four: The Agora Challenge

The challenge of building Agoras for the 21st Century is presented to us individually and collectively. It becomes our responsibility to learn how to initiate as well as how to take part in evolutionary design communities. The opportunity provided in this program offers learning and application experiences that enable participants to advance toward becoming builders of New Agoras.

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Group 2

The Y3K Solution: Repositing the Ideal Seeking Social Systems Design

Sabre Brahms, USA
Gordon Dyer, UK
Yoshihide Horiuchi, Japan
Lynn Jenks, USA
Gordon Rowland, USA

The Y3K Problem: Evolutionary Guidance toward the Year 3000

Sabre Brahms, USA
Gordon Dyer, UK
Yoshihide Horiuchi, Japan
Lynn Jenks, USA
Gordon Rowland, USA

"Citizens, the 19th Century is grand, but the 20th Century will be happy. Then there will be nothing more than old history. Men will no longer have to fear, as now, a conquest, an invasion, a usurpation, a rivalry of nations with the armed hand, and interruption of civilisation depending on the marriage of kings, a birth in the hereditary tyrannies, a partition of peoples by a Congress, a dismemberment by a downfall of a dynasty, a combat of two religions meeting head to head, like two goats of darkness, upon the bridge of the intimated, they will no longer have to fear famine, speculation, prostitution from distress, misery from lack of work, and the scaffold and the sword, and the battle, and all the brigandages of chance in the forest of events. We might almost say: there will be no events more. Men will be happy."

Victor Hugo "Les Miserables"

1. Introduction

This report summarises the progress made by the so-called Y3K Group during the 10th Biennial Fuschl Conversation. The idea for naming the group had been suggested by Gordon Dyer and Gordon Rowland in March 1999, triggered by a climate of concern generated over the so-called Y2K problem - the fear that a large number of the world' computers might crash on the changeover from 1999 to 2000. In the event, the predicted Y2K disaster was largely a non-event - a technological problem was cured by a technological fix.

In the view of Rowland and Dyer, this simple technological problem was much less problematic and less serious than the issue of "what would we as systems designers wish to see for humankind for the Year 3000". Our consciences and senses told us that the world that mankind had created was in a sorry mess: for instance the gross inequalities of wealth, power and opportunities that still exist between nations and peoples; continuing wars and terrorism; a global spread of horrific diseases; drug related crime and, perhaps most worrying, the concerns with Planet Earth itself as it suffers from pollution and global warming. Thus Y3K became a metaphor for a much more desirable future. The Year 3000 also had an advantage. The choice of Y3K to focus the vision was deliberate in that it is far enough away for it to be removed from our current biases and to be NOT predictable on the basis of our current knowledge and technology. With a systems design approach we have the chance to create a vision of what we want and then begin a design process towards that vision. It

also forces us to think and not rest on the assumption that everything is too difficult and that nothing can be done. Something ought to be done if succeeding generations and we take responsibility to continue to design the future and not just let the future happen. Yet too, our work must be framed within a guiding principle of system design that "it is unethical" to design a system for someone else. At best we can provide an outline, a set of markers, to help current and future generations to follow.

The aim for outcome from this initial Fuschl conversation could not be very ambitious. But we hoped that we might be able to define some markers for action in our lifetimes that we might be able to begin immediately which would take us towards a vision of a more desirable vision of global humanity in 3000 and not away from it. By the end of the conversation we had achieved a set of principles for Evolutionary Guidance (Banathy, 1989) for 3000, along with several avenues for further conversations.

2. Participants and Preparation

The members of the group were:

Sabre Brahms	USA	(Sabre)	
Gordon Dyer	UK	(Gordon D)	- co-ordinator and rapporteur
Yoshi Horiuchi	Japan	(Yoshi)	
Lynn Jenks	USA	(Lynn)	
Gordon Rowland	USA	(Gordon R)	

The team represented an interesting variety of backgrounds and cultures for tackling this theme, as was quickly demonstrated when they shared their input papers. Sabre described that she hoped to be able to apply the theoretical work of the conversation to the area of sustainability in her own life. Her paper also drew on some very interesting ideas due to Benyus (1997) which reminded us that we should learn to listen to nature for clues in maintaining sustainability and energy efficiency. She also provided us with the extraordinary quote from Victor Hugo above, which reflects unfulfilled hopes of a better future from an 19th century perspective. Gordon D had provided an initial set of triggers that form the basis of the introduction to this report. He looked for a time when gross global inequalities and images that, for example, that came through television from Ethiopia left him feeling less guilty. This could only happen when Governments in emergent nations were inclined to spend less resource on arms and more on positive technology. It was essential to re-evaluate the spiritual, intellectual, social and physical nature of humanity, and mankind's relationship with our Earth environment. Yoshi provided a historical summary of changes over the last 1000 years as a precursor to providing a range of trigger questions that would need to be addressed, including "what we could design and what we must leave". He was interested in exploring criteria for what it meant to be "rich", "complete" or "satisfied". Lynn had reflected on a possible framework for developing this conversation. This linked to questions of:

"I"	how I want to be? how I should be?
"We"	what needs to be addressed collectively in terms of social systems
"Natural World"	what we needed to do in relation to the natural world [hereafter shortened to “World”].

Gordon R described how he had drawn on an experience whilst at the 1999 Asilomar conversation which linked to our inability to describe the complicated nature of sand types (it was all just "sand"); but that the people of the North had many words for snow. This had led him to reflect that if language could be purposefully changed then it might serve as an attractor for a desirable future. Hence he had drafted his input paper to illustrate the possibility we might develop complex language around an attractive concept such as love, for example, in 20,000 words, the equivalent of our typical current working vocabulary.

3. Structure for Emergent Triggers

Following the introduction and discussion of the input papers, a number of key trigger questions emerged which were located within the structure of a basic system design process: preparation for design, leaping out, and valuating the design process. See below:

Preparation

- reflect on past and present
  what is good? what is bad?
  what have we gained and learned as human beings so far?
- contemplate future
  what can we assume? not assume?
  what changes are unlikely? likely?

Leaping Out

- what would characterise the ideal? what markers
  or indicators can we use?
- some possible frameworks for thinking: I, We, World
  dimensions of "I"
  core values and ideas..leading to ideals and enabling
  systems and Evolutionary Guidance System (EGS)

Valuation

- what does it mean to be human?
- what question is left out?

We needed to check that we remained within the principles of systems design with this list. We noted that it was simply a list, it was not a model. Other cultures might challenge our answers to the questions but not the framework. Differentiation between cultures would come from their answers to "How do we guide evolution towards the ideal?" Gordon R noted that it would be awkward to apply typical objective measures for valuation to a future 1000 years hence, so he suggested that a richer understanding of what it means to be human might be a reasonable proxy measure of the value of our work.

This initial framework provided many options for proceeding, from dealing with one or two questions in depth, to superficial coverage of most or all. To begin we selected what seemed the most interesting question - what does it mean to be human?

4. Humanness

There was unanimous agreement to three characteristics identified as being fundamental to humanness and human needs:

- intellectual curiosity and physical challenge e.g. pioneering spirit
- creativity and the need for achievement
- affinity and love

The conversation was enlivened by consideration of challenging questions prompted by the prospects of advances in space travel and medical technology in the next 1000 years. Within that timeframe, medical technology may make it possible to live for say 600 years but would an individual that old still be curious? Two important questions were:

> "Does the human species need this planet?"
> "Do we wish to remain human?

and, for example, if we were to develop technology to colonise Mars would we still be human?"

These deeply philosophical questions could only be answered on an individual basis. We choose here to illustrate two very different views on this question:

View A

> Mankind has not necessarily any special link with Earth although Judaeo-Christian religious perspectives will assume this. A Buddhist view assumes no special links with Earth or with corporeal form. Under this perspective the gradual disappearance of human form or replacement with technology is conceivable, even to the ultimate of man being non-corporeal and not based on this planet.

View B

> A view of mankind being firmly rooted to Earth, as simply one of many diverse species on a closely integrated ecosystem which has evolved on the Planet. This perspective may not admit that living in a capsule on Mars in 2600, and for example drinking re-cycled urine as a water source was "human".

Subsequent discussion and sharing in plenary raised the possibility of a third perspective based on a middle road approach to applying nano-technology or neural technology to humans. Enhancement of the human being with these techniques rather than replacing the human being, seems to be a key issue. We were also reassured when reminded by Nicholas Paritsis in plenary that "Computers do not think, they simulate thinking."

Should we return in 3000 what would we miss?

We then returned to the other questions under "preparing to design". We already knew what was bad in the current world. Thus we decided to reformulate the remaining questions under "reflecting on our past and present" to read

"What would we miss in 3000 if we returned and found it was not present"
We shared our thoughts following time for individual silent reflection and then collected them through a Nominal Group Technique-type process. The individual thoughts clearly reflected individual value systems. We made no attempt to evaluate or prioritise them, and provide the full list we generated at Appendix 1. Of interest was that though there were differences in detail a number of key themes emerged. If they were not present in the Year 3000 the group discovered that they would all miss:

- interpersonal relationships
- a sense of fun and joy
- creative art process
- intellectual and physical accomplishment (passionate endeavour)
- a healthy and beautiful natural world
- expressions of our past and culture
- social structures (education, judicial,...)
- evidence of characteristics that underpin our current social structures (respect, discipline, good behaviour,)

Yoshi pointed out that this was simply a list, and as such does not convey any feeling of the experience of participating in the activity indicated. We noted that virtual-reality technology might be a future mechanism for recording this. In pursuing this line further we agreed to generate a further list of items. This would contains things which we would be either very disappointed if they were not present within society in 3000, or which would be our aspirations for that time. This effort generated two different types of list: features of the world we wanted to see at that time, and processes and feelings which we hoped would be present in humanity to a large degree:

Features

- everyone has sufficient food, water and shelter
- evident recognition and appreciation of human multi-intelligence, as defined by Gardner (1999)
- an imperfect but "loveable" world in which:
    - harmony/balance of living creatures is evident
    - advantages and disadvantages of imperfectness are recognised
    - effect/benefits of music etc on human development is evident
    - there is appreciation of birth, growth and death
- a design culture as a away of thinking coupled with a non-coercive EGS, as indicated for example by a greater participation in visioning and in generating markers for further futures.
- new ideas on currency (away from money as a sole measure of worth)
- learning and development systems, consistent with what is known and needed by the community
- energy consumption in balance between peoples

- evident progress towards reducing imbalances in power and opportunity

Processes

The processes we hoped to see:

- everyone falling in love/being loved
- conflicts that occur are resolved in ways that help people to learn and grow (and not resolved by violence)
- sense-making occurs at deeper and deeper levels
- all people are able to pursue their aspirations
- giving and receiving kindness
- human life is seen as a creative and artistic endeavour
- feeling of satisfaction for a job well done
- being touched by beauty
- enjoying the sensory experience (all senses)
- protecting another and being protected
- feeling satiated or complete

We recognised that these feelings were important bases for markers for an Evolutionary Guidance System (EGS).

Design Context

We continued as part of the preparatory phase by trying to consider what assumptions we might make or not make for this long-term future. The questions of assumptions represented the first major difficulty in the progress of the conversation. This arose from a combination of perspective, culture and language, and whether or not current technology predictions for the next 30 years should be incorporated. The difficulty arose not just between individuals from East and West but between individuals from the West. We discovered a major difference between the definitions of "assumptions" and constraints used by Gordon D and Gordon R. Following a review of the conversation process the ideas were recast as a list of elements of the context within which the design would still need to proceed in the next millennium, i.e.:

- the existence of tools and technology influencing human development and impacting on the environment
- continuing scientific research making the impact of new technology even more important to assess and control
- continuing medical research and technology allowing the definition of "humanness" to be revised
- some continuing imbalances between resource and power rich/poor remain
- some continuing concerns with Earth environment
- the need for ongoing systems design

We noted the possibility of "special events" or discoveries, which completely change the nature of our understanding of the Universe and the opportunities that may open up, but we cannot speculate in 2000 at the possible influence of such an event.

5. The Leap

As part of our leap we considered two major ideas: the first draws on a community discussion approach practised by the Okinagan Indians of British Columbia; the second relates to the "I", "We" "World" mentioned above.

The Okinagan(OK) Model

Lynn introduced us to an ancient and remarkable technique practised by the Okinagan (OK) Indian Nation of British Columbia for gaining an understanding, reaching agreements, and solving problems concerned with difficult issues for which competing perspectives exist. He provided the following description. Referred to as the “Four Societies,” the approach affirms that there are four important perspectives that will always exist and need to be heard. The four are (1) the traditionalists who are concerned with history, traditions, ceremony, and a “sense of place;” (2) the visionaries who are concerned with the future, what might be, and how that imagined future might be attained; (3) the interpersonal relationship folk who are concerned that all voices are being heard and honoured; and (4) the action- oriented people who wish to “get on with it,” to solve existing problems immediately.

The approach, here overly simplified, asks each member of a group to identify with the perspective (or Society), that most closely represent their natural concern and interest. Each Society forms and meets as a group to address the issue(s) solely from their single perspective. Following the meetings, the four groups convene to report their deliberations and/or recommendations. The primary responsibility of each group is to develop a deep understanding of the other three perspectives and to ensure that the other groups understand theirs. The basic premise is that deeper understandings are reached across the four perspectives. The process creates a context and environment in which a heightened respect for others is developed and full consideration of ideas and multiple perspectives becomes more likely. The process diminishes the motive for personal victory and enhances the motive for integration of competing interests.

The I-We-World Domains

We attempted to apply the four OK perspectives to three different system levels: I, We, and World. In doing so we found that the relationships among levels, that is, I in WE, I in WORLD, and WE in WORLD, were as much or more important than the levels themselves. A draft of the characteristics we generated for the ultimate combination of I in WE in WORLD was collated by Gordon R and is given below. The manner in which he generated this from the levels and relations can be traced in Appendix B. Much more work could be done here, but the issues of balance among the perspectives, and relations of individual to social group and natural world were to have substantial influence on the formation of our EGS.

I in WE in WORLD

Visionary: dream with openness, understanding, appreciation, and connection to self, collective, and world

Traditionalist: foster respect for, and develop and nurture habits that celebrate and preserve, what is good in the collective and world

Interpersonal relations: be present as an individual who respects, and who through dialogue/conversation, nurtures relationships with others and the natural world

Action: lead through responsible action and appreciation for connections

Extending the Model for Multi-Cultural Perspectives

We decided to explore the OK model within our own group. The following analysis of the outcome and process was provided by Yoshi. Figure 1 below shows his analysis of the interactions among the four role types, or rather orientations, of the OK model as might be expected within a typical systems design group. In the picture,

White arrow: Indicates strong influence
Solid arrow: Indicates influence
Dotted arrow: Indicates weak influence

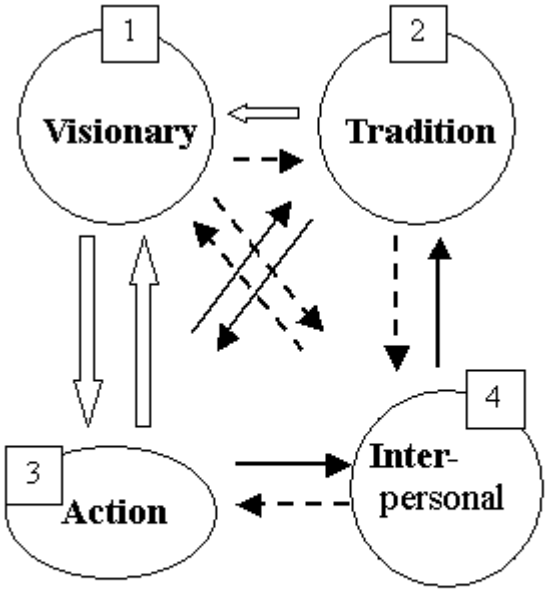

Figure 1

Those four role orientations of the OK model are interrelated and interactive. Comments on interactions between them follow:

(1)Visionary <= (2) Traditions

Systems designers will take into account tradition (and history) to formulate their vision. Hence, a strong influence of Tradition on Visionary is possible. On the other hand, the influence of Visionary on Tradition seems to be weak. Rather, the results of Action influences Tradition particularly where action has led to success, which in return influences Action.

(1)Visionary =><= (3) Action-oriented

This seems to be a key connection for normative systems thinkers. They have an idealized Vision of the future, from which the Action plan is developed and implemented. From such Action planning and implementation, the idealized images of the future will be modified/new Visions will evolve. However, see the critique of this below in the context of the difficulties that emerged within our own group's conversation.

(3) Action --><... (4) Interpersonal Relations

Action can influence Interpersonal Relations, while accumulation of Interpersonal Relations may or may not lead to Actions.

(2) Tradition...><---(4) Interpersonal-Relations

It seems that the Interpersonal Relations can help formulate Tradition, while Tradition has some influence on Interpersonal Relations. Ackoff (1981) presented a typology of planning for systems design, as follows:

Inactivism	Do nothing and wait for calm water again
Reactivism	Go back to the Good Old Days
Preactivism	Prevent a predicted future problem, and
Interactivism	Design and create the future

Given the possible extreme alternative viewpoints of system designers, the Tradition-Interpersonal Relations connection could either be seen as

Inactivism:	by a proponent who argues "Let nature take care of itself"
Interactivism:	by a proponent who argues " We should develop our systems design culture through interpersonal relations"

The Group did not spend much time on discussing the Tradition-Interpersonal Relations connection. This connection could be a useful area to explore in Transcultural Conversations.

(1) Visionary...><...(4) Interpersonal-Relations

This connection may seem less important for many systems designers. But there could be Visions of the future based on Interpersonal Relations, i.e. using Interpersonal-Relations as means to define future visions. But we can also imagine there could be a Vision of the Interpersonal Relations themselves, i.e. Interpersonal Relations being the key objective of future visions.

The Visionary - Interpersonal-Relations connection can be related to a non-normative systems design process like the Ethical Accounting Statement (EAS)(Pruzan 1990). EAS places emphasis on consensus-seeking processes and not on idealized outcome.
Reaching a vision in the Interpersonal Relations mode would not use concepts such as "leadership," or "normative thinking." Rather, it will probably use concepts such as "naturally emerging consensus," and "harmony,"

Yoshi offered the following metaphor to clarify the difference between idealized systems design in the traditional sense, and Interpersonal-Relations based systems design.

> "Idealized systems design (in the traditional sense) is like a steamship. It overcomes natural obstacles such as wind and tide, and reaches its destination "overcoming environmental restrictions" with a strong will, and a clearly defined goal. On the other hand, Interpersonal-Relations-based systems design is like a sailboat. It does not stand against nature; rather, it will coexist with nature and take "natural advantage" of it. The sailboat travellers can change their destination, as the wind goes. But the voyage will be harmonious with its environment, and probably more fun than the steamship voyage, if the travellers allow the travelling process as a part of its value of the journey, rather than considering the end as the sole purpose of the journey. With a steamship, you will arrive at the destination as selected earlier. In the sailboat, you might come out as a different person from the voyage, since the journey itself was an end, in addition of being the means of reaching a destination."
>
> (Horiuchi, 1979)

The Group found this metaphor extremely helpful, but noted that idealized system design does not necessarily imply a strong omnipotent designer in charge, or that direction is never changed based on dissenting input. Lynn suggested the following expansion to the metaphor. The steamship is goal oriented, has a destination in mind - that of arriving at the best possible port of call. The schedule may be adjustable, the crew may change at times, and deviation from the agreed upon course is permitted only by consensus. But, there is general agreement that certain travel conditions (values concerning the end destination as well as crew participation) will remain constant.

Application of Analytical Framework to our Group Experience

The Group ran into process problems from time to time, for example in deciding how next to proceed and in setting its priorities. Yoshi offered the following reflections based on the analysis above. He concluded from Sabre's input paper and her other comments that the Visionary - Interpersonal-Relations connection was crucially important to her. When Sabre pointed out the importance of the Visionary - Interpersonal-Relations connection, the others tried to grasp Sabre's

point in their own way. It appeared that Lynn and Gordon D tried to take Sabre's point as logical inputs to a systems design approach which emphasised the Visionary - Action connection. They analyzed Sabre's points; then, systems design approaches, and tried to construct an expanded systems design model. Gordon R seemed to take Sabre's point as a gestalt in parallel to Gordon's overall Y3K framework. Since each of Sabre's and Gordon's frameworks is probably complete in its own way, projecting one framework on another creates a new, overlapped image.

The Group felt that more time was needed to reflect on their experience and the analysis, but the OK model and the analysis seemed to represent a powerful tool for systems design and process looking towards a long term future. The strength of the interconnections (the state variables) in any given context could be seen to represent that culture, so the OK model would appear to be highly flexible.

A key word for Y3K is not perfection, but balance. This implies both balances of the four role orientations of Vision, Tradition, Action, and Interpersonal Relations, and in balance between process and outcome during systems design.

It is possible that our team did not maintain this balance enough in our Y3K Conversation, since we incorporated only the Outcome aspect of the Interpersonal-Relations - Visionary connection, without implementing the Process aspect of this connection in our own Conversation process. Yoshi suggested, on reflection, a metaphor for our process was that we were usually dashing like a football player trying to catch a pass at a predetermined point. On the other hand an Interpersonal-Relations-Process minded football player, would not run to a predetermined point to catch a pass, rather, would run side by side with the quarterback, passing the ball between themselves, seeing where they "naturally" went as the wind took them. This may be what Sabre missed during our Conversation. When we become able to incorporate such a process, we might think of ourselves as systems designers with a higher degree of enlightenment. We note too that it is very difficult to achieve this within a week at Fuschl, when there is an inevitable priority given to outcome (written report) which does not lead easily to presentation of the experience of such a process.

6. Evolutionary Guidance System

Our final landing point for this conversation was on key principles for an EGS. This was informed by the themes and processes that emerged from our discussions from the preparatory phase, and from our leap. The EGS is characterised by five principles:

1. Movement towards wholeness, in terms of both greater complexity and our markers generated under "I in We, and We in World"

   WHOLENESS

2. Balance (Balance in terms of emphasis and in elements informing each other)
   Example: - between the 4 perspectives of the OK model
   - between process orientation and goal orientation
   - within the themes we identified (e.g. things we would miss)
   - the domains of human endeavour as given in the Banathy EGS*

   BALANCE

3. Preserving and increasing diversity of human and other organisms

DIVERSITY

4. Enriching human experience

RICHNESS

5. Increasing dispersion of benefits

DISPERSION

6. Harmony among the principles above

HARMONY

Harmony represented an integrative principle. For example, increasing diversity or differentiation, and a move to wholeness might seem contradictory. However, the two combined — diversity AND wholeness — represents the emergence of greater complexity, a new whole made up of a great variety of parts that are differentiated by function and structure and integrated by their intercommunication and mutually beneficial relations. Such emergence is perhaps fundamental to the evolutionary process the EGS is intended to guide. Thus a state of harmony achieved through the combination of the various principles is implied: diversity AND wholeness; richness (depth) AND dispersion (breadth); balance in attention and energy given to all (see graphic depiction below). And the desired evolutionary future is a move toward greater and higher levels of complexity.

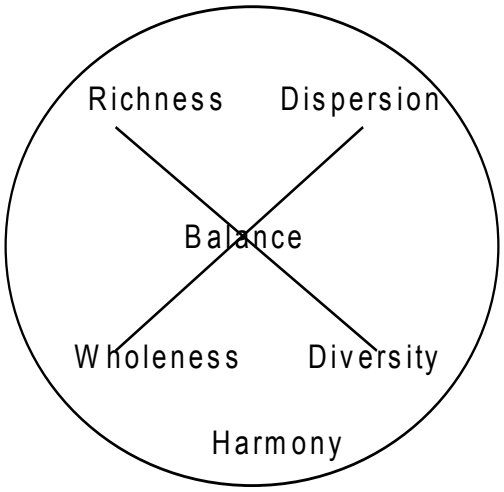

Figure 2

Our conversation gained from the wider discussion in the final plenary presentation. A view emerged that the dominant characteristic of these principles is "balance". This is balance both

within a principle and balance between principles. For example, we would not wish or expect there to be complete equality in terms of dispersion of benefits. While doubtless impossible to achieve, such a position would remove incentive and challenge from individuals. We propose an "appropriate balance". It is clear that our current vocabulary is inadequate to describe the types of principles and processes that we have in mind. Gordon D reflected that there might be words in other languages and cultures that we could incorporate into the systems vocabulary. Charles Francois reminded us of the word "palaver". In Swahili culture it means an extended discussion within a village community to reach agreement, i.e very close to the ISI-style of conversation. We note that ethnic words like this when they are incorporated the English language often assume a pejorative meaning.

Hence as our conversation closed the issue of language had resurfaced. We have two language linked themes for possible future work (1) to search for ethnic words to enrich our systems vocabulary (2) to develop a more complex language to describe attractors.

7. Conclusion

All members of the Y3K team expressed satisfaction at what they had gained from the week. At the start of the conversation no one had a very clear idea at the direction that would be taken or what to expect as outcome. So there was a collective sense of surprise at the feeling of progress we shared. We found some very rich trigger questions to stimulate fundamental reflection on what it means to be and to remain human, and whether the human species has an immutable connection to the Planet Earth through its place in a complex "chain of being". Given the topic and the variety of perspectives that the team represented it was not surprising that we needed to take stock and review our conversation process from time to time.

We were able to begin visioning for 3000. We did this through consideration of what we would miss from our heritage and the present, if it were not still to be found, or be disappointed with if it were still not achieved, or have ambition for, by that future. Our conversation was not without its obstacles. We found it impossible to reach consensus on a set of assumptions to make for 3000 but we bypassed this difficulty by asking a different but related question. We also had problems with maintaining the conversation process to achieve optimum positive synergy. An exploration of an Okinagan Indian Nation model of group discussion gave us insights on possible underlying causes of the process problems we had experienced. These were shown to be linked to the variety in individual conversation/design style preferences – from those who prefer an (idealised) outcome approach to those who prefer a consensus seeking approach. Thus the OK model proved to be a powerful tool for thinking about conversation process and systems design.

The exploration of the Okinagan model coupled with the "I in We" and "We in the World" perspectives also gave fruitful insights towards six principles, which constitute an EGS, for the Year 3000, or similar long-term future. We also identified some markers in terms of desirable behaviour patterns for the Year 3000. These desirable behaviours provide a basis for considering future education and human development programmes, which will be worthy of exploring in further conversations. A search for a richer systems vocabulary and language base was also identified as a direction for future work.

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Appendix 1

Things that we would miss if not present in the Year 3000

- Family structure and familial relationships
- friendship and love
- laughter
- collections of books/archives /history
- expressions of past cultures (libraries art galleries etc)
- challenge of understanding complexity and acting on it
- surprise
- living beings
- sense of fairness
- notion of family
- healthy natural world
- interacting with other people, learning together, community
- love between living beings and things
- navigation system
- scientific research but....
- privacy
- seasons, water, sky, rainbows, flowers
- beauty
- education systems but.....
- pets
- friendship
- laughter and joy
- respect
- discipline
- opportunities for sport/fun
- sense of responsibility towards others
- variety and diversity
- passionate endeavour
- rituals to celebrate
- spirituality but....
- genius
- music, sculpture, dance, painting, plays, movies
- warmth (sun)
- language - written and spoken
- social support systems but...
- conversation
- recorded history and stories
- education system for children
- variety plants/animals
- systems design
- beer, chocolate, strawberries, bread and women
- judicial system
- police and fire-fighting systems
- mother's role
- tools and technology but.....
- participatory governance

Note: the items with **but..** would be missed but we would expect to see considerable changes within their products and their processes linked to a fairer world

Appendix 2

Characteristics of the ideal
(year 3000 reference; Okinagan model as framework; I/we/world as system levels)
Gordon Rowland

I

- **Visionary:** is able to dream (because one believes that change is possible); sees through complexity in order to find or generate the seed (parti) for the new
- **Traditionalist:** appreciates ritual; develops and nurtures habits for the good
- **Interpersonal relations:** is centered (no hidden agendas or phoneyness; is self-confident); is present (compassionate, affectionate, empathic, generous, good at listening)
- **Action:** courageous; physically, intellectually, spiritually fit

WE

- **Visionary:** collaboratively design; remain open to ideas; diverge
- **Traditionalist:** join together in ritual/celebration; preserve information regarding culture
- **Interpersonal relations:** engage in dialogue and conversation; hold and express mutual respect
- **Action:** act as group on collective will; accept collective responsibility (as opposed to blaming, disavowing)

I in WE

- **Visionary:** share dreams; invite others to share in dreaming; show paths and help others do the same
- **Traditionalist:** foster respect for rituals; act as a role model (habitually preserving the good)
- **Interpersonal relations:** see self as individual in group; be present in company
- **Action:** take the lead; lead by example (and don't ask anyone to do anything you would not do yourself)

I in WORLD

- **Visionary:** open up to, listen to the world (consciously and unconsciously; using all senses); appreciate the complexity of the world (how everything relates to everything)
- **Traditionalist:** engage in ritual to connect to the natural world; nurture habits that benefit (do no harm to) the world
- **Interpersonal relations:** see self in and connected to the world; listen to what the world says regarding potential action
- **Action:** act with respect for the interconnections of self and world; take, accept as a gift, and use only what you need

WE in WORLD

- **Visionary:** design with (as opposed to upon) nature; listen to nature for ideas (biomimicry); construct meaning through co-creative process (human-human, human-artificial world-natural world)
- **Traditionalist:** celebrate nature (e.g., natural cycles); preserve diversity; seek and negotiate understanding through observing and sharing
- **Interpersonal relations:** listen and speak to nature; recognize and appreciate how little we know; honour and nurture relations among social and natural worlds
- **Action:** act with respect for the natural world; accept responsibility for cultural evolution and consciously co-evolve

I in WE in WORLD

- **Visionary:** dream with openness, understanding, appreciation, and connection to self, collective, and world
- **Traditionalist:** foster respect for, and develop and nurture habits that celebrate and preserve, what is good in the collective and world
- **Interpersonal relations:** be present as an individual who respects, and who through dialogue/conversation, nurtures relationships with others and the natural world
- **Action:** lead through responsible action and appreciation for connections

Development of a Learning Community at Fuschl 2000

Gordon Dyer, UK

This report summarises the steps taken to develop a learning community at Fuschl 2000. There were two objectives in this:

(1) to respond to previous feedback that during conversation events it was very easy for groups to get so locked into their own discussion that the inter-connecting features of group discussions and processes were overlooked, and thus the potential for learning was not maximised

(2) to share ideas on how conversation methods might be introduced into their own communities.

1. Interconnecting Experiences in Group Work

Time was allocated within the plenary sessions to discuss and record common experiences and conclusions emerging from individual group presentations. In this way it was hoped that the groups would learn from each other and then reinforce this learning through their own on-going group work. Plenary sessions were held on Monday and Tuesday evenings to allow groups to report on their interim progress, with a final plenary on Friday morning. The evening sessions were one hour long, the final session 2 hours. With 4 groups, each had 15 minutes in the evenings and 30 minutes in the final session, but they were briefed to use about 1/3rd for their presentation and 2/3rd for plenary discussion. Gerhard Chroust acted as timekeeper and Gary Metcalf volunteered to **identify and to record common features and connections in the reports of at least two groups**. These are categorised in the table below in the form of (1) common needs within groups to do, and (2) common themes explored.

Common Group Needs	Common Themes Explored
Day 1 (preparing for design) • establish group conversation rules • begin with clarification of basic terms and themes • reduce complexity in order to focus meaning • search for ideals and relate these to specifics • find examples in application • explore tacit knowledge and fundamental assumptions of group members	• exploring and distinguishing between different forms of knowledge • crucial role of information, and difference between cognition and awareness • difference between “What is” vs. “What could be” vs “What should be” • what is essentially human? and what is not? • what future role is seen for technology - is it for replacement of human role or enhancement?

Day 2(preparing for/beginning to design • ground concepts and emerging models in some way • review group processes	• key characteristics of human social systems • focus on multiple systems types and their inter-relationships • attempts to capture and relate many system levels (from specific to abstract) • understanding commonalities and differences as they relate to identity • integration and interrelation of experience to knowledge • focus on the human condition
Day 5 (**still preparing for /beginning to design*****)*** • evaluate and valuate progress • review group processes • allocate responsibilities for reporting and further work	• social tensions created by commonalities and differences (e.g. inclusion vs. exclusion, same vs. different, etc.) • what is "better" - who should decide • who should design • tension between what is; what should be • how to study complex issues e.g. information • trans-disciplinary approaches - searching for higher principles of order • relations of consciousness/awareness to meaning • description of feedback - importance of feedback to continuity of communication (delays because technology makes communication feel artificial) • integration of approaches vs. emergence of new ways/levels of understanding • search for connections between self/others, "I" "We" "World" • current versus future - stability vs. change • the notion of attractors vs. drivers as agents for change • what does it mean to be human?

2. Conversation about the Conversation

Following the Friday presentations, the session was extended to enable a "conversation about the conversation". Some key points were:

(1) the attempt to discuss the inter-connections between the four groups work was welcomed, and recommended as a feature of future conversations. The features we found common above may also be useful to guide future conversation groups.

(2) a discussion around the trigger question

> ***"How can we take what we have learnt at Fuschl and apply this to our own communities and contexts".***

It has always been the hope of Fuschl stewards that participants will contribute to the dissemination of the conversation method by applying it in their own communities. It is recognised that in doing so they would need to adapt the conversation method and rules for their own context. Suggestions for the possible application of conversation was sought from participants via a "valuation" questionnaire. Ideas included suggestions to use conversation methods :

- for building a research team for an internationally organised project
- in university and research activity
- as an approach in blocked seminars
- for shifting mind-sets at workshops and seminars
- for seminars or a faculty retreat at home University
- for building the sense of community amongst local school staff
- with small groups of students at school
- to improve social dynamics of a small group
- for quality circles

There was shared recognition that the conversation format is a powerful and potentially beneficial method for any small group to learn together. However, initially if working with non-academics it may need to be more problem-oriented. After some experience, more general topics might be used. Gordon Rowland described his experience of using conversation within Ithaca College. Two recommendations then arose for planning Fuschl 2002:

- that a number of students should be invited to Fuschl 2002 with the assumption that their College would be prepared to fund them.

- forming an Action Research Group for Fuschl 2002. The hope was that this would allow for sharing of experience of active case studies involving use of conversation and/or social system design

(3) the poverty of the English language to describe many of the social systems ideas that had been discussed at Fuschl. Yet, as Charles Francois reminded us ethnic words can provide a much more sensitive appreciation. For example, the word "palaver", in Swahili it means an extended discussion within a village community to reach agreement, i.e. it is very close to the ISI-style of conversation. We noted the sad legacy of history that when ethnic words like this were incorporated into the English language they often assumed a pejorative meaning. It is recommended that:

- a glossary of ethnic words which we might use to convey the sensitivities of systems design that we seek, is compiled. Colleagues globally are invited to provide suggestions and comment.

Reflections on Preparations for the Conversation: Which Competencies Might Be Applicable to the Year 3000?

Brahms Sabre, USA

The task of envisioning the world in the year 3000 is so broad; sustainability is only one possible line of inquiry toward defining the essential aspects of a future society. Because of my concerns for the fate of the planet, this topic, though limited in scope, provided me with an excellent foundation for my participation in the group.

I read several books on the topic and was quite influenced by one that viewed sustainability through the eyes of scholars in the Southern Hemisphere (Gomes, Kirana, Songabele, and Vora, 1992). The four authors, from different countries in Asia, Africa, and South America, were invited to Holland to assess Dutch society in terms of sustainability. The book made a clear point that the wealth of the Netherlands is dependent on the exploitation of other countries, mostly those in the Southern Hemisphere. Though this is not a new point, it was presented from a uniquely southern perspective, a point I had not understood so clearly as a northerner.

Interested in continuing my research that would further an understanding beyond my perspective as an American, I reviewed a book written by a group of Africans (Kalipeni and Zeleza, 1999), which assessed sustainability issues in African cities. The authors also intimately linked a lack of sustainability with poverty and the unequal distribution of wealth. Additionally, the authors suggested that in South Africa, for instance, a lack of sustainability in cities relates to the original design of the cities themselves. Architectural blueprints were originally drafted with a colonial/domination mind-set. Though the rhetoric and politics continue to change in South Africa, people remain living in cities that were built to keep blacks from white and to keep wealth in certain districts and out of others.

The above books successfully assessed some of the problems associated with sustainability but did not offer many suggestions for overcoming our current dilemma. I therefore proceeded in my inquiry to seek creative and hopefully radical solutions, radical because as Banathy (1996) explains so well, it will take nothing less than a complete redesign of our current social systems to affect positive change in our future. I found some very compelling possibilities in Benyus' (1997) writing:

> *Nature runs on sunlight.*
> *Nature uses only the energy it needs.*
> *Nature fits form to function.*
> *Nature recycles everything.*
> *Nature rewards cooperation.*
> *Nature banks on diversity.*
> *Nature demands local expertise.*
> *Nature curbs excesses from within.*
> *Nature taps the power of limits.*
>
> *(Benyus, 1997, pg. 6)*

Benyus first asserts that nature conducts itself in a sustainable manner. The author then suggests that we have much to learn from nature's example. The main premise is as follows: if we mimic nature's ways, we can learn to live sustainably as well. The book provides various examples of research from fields such as biology and structural engineering that is looking to nature to help answer human problems. I will review one case as an example.

Wes Jackson, a biologist and agriculturist, who lives in Kansas, the prairie region of the United States, has spent over twenty years researching Indigenous prairie plant life in order to understand what makes it a sustainable plant community. Jackson is concerned with current planting practices. Each year, the earth is tilled, new seeds are sown, much water is administered, and large amounts of chemical fertilizers and pesticides are applied. This modern agricultural system uses too many resources (i.e., water and human energy), poisons the ground and water, and erodes thousands of pounds of topsoil each year.

Jackson's goal is to produce food for human consumption in a system modeled after the indigenous one found growing on the prairies of Kansas. He carefully observes and documents this perennial system, which renews itself from year to year. It does not need to be newly tilled or seeded, it needs no more water than rain provides, and its natural diversity protects it from insects, thus eliminating the need for pesticides. Fertilizer is provided through the decay of plants that produce. Jackson analyses his data and then applies it to experimental farms that run themselves like a prairie.

Benyus compares the current human tendency toward over-consumption with other natural systems. She describes that we conduct ourselves like a "Type I" system, which will be defined in detail below. She suggests that we have the developmental task, as a society, to move to higher levels of sustainability, as is typified by "Type II" and "Type III" systems.

Type I systems use resources as quickly as they can, reproduce as much as possible, obliterate an environment, and move to the next opportunity. An example of such a system is a group of flour beetles that live in a barrel of flour. These beetles quickly consume the flour, reproduce, and move to the next bin. Another example of a Type I system is a group of weeds in a freshly tilled garden bed. They take advantage of the disturbed soil and make very quick use of nutrients. There is nothing wrong with this system type in connection with other more sustainable communities. The problem appears when Type I systems become more powerful than others.

Type II systems function as longer-term communities. They use energy more efficiently and produce fewer offspring, but store energy for times of limited resources. They successfully overcome Type I systems when resources are limited. They are still more vulnerable than Type III systems, but are more stable than Type I systems. An example of such a system is a field that is filled with perennial berry bushes and other woody seedlings. The plants in this system store energy in their roots, thus able to renew themselves after a drought. Where berry bushes grow, weeds are crowded-out.

Type III systems use patience as a strategy. They are the long-term dwellers on the earth and exist in relatively stable equilibrium. They use resources very carefully and produce very few offspring, but they protect these offspring well. An example of such a system is a redwood forest. Redwood parents shade their seedlings that can only tolerate less sun. Redwoods can survive blazing forest fires, long droughts, insect attacks; they live for hundreds of years.

To conclude, I would like to weave together the assessments in the beginning of this paper with the suggestions at the end. As is stated in Gomes, et.al. (1992, pg. 106), "in a sense, you could say that the Western civilization and its northern peoples are living a hopeless case of drug addiction. No matter how clearly you communicate to them that their behavior is destructive to themselves and others, they can not control it. They keep on taking more and more, unless they are forcefully restrained".

I agree with the above assessment but disagree with its hopelessness. Though we humans sometimes act like Type III systems, for instance, we are very protective of our young, we also act like Type I systems, particularly in our use of planetary resources; in reference to sustainability issues we act more like the beetle in the flour bin. A major and radical ideological change is necessary in order to stop our current addictive behavior toward consumption, but I would like to believe that this change is possible.

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Group 3

Awareness and Social Systems

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Awareness and Social Systems

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1. Introduction

This conversation took place as part of the 2000 meeting sponsored by the International Federation for Systems Research in Fuschl, Austria. Its purpose was to explore the nature of human social systems, not through formal analytical processes, but through the ways in which we are, or might become, more immediately aware of them. The ultimate goal was to improve the ability of the participants to make conscious choices about the ways in which we participate in the human world.

1.1. The Participants

There were five participants in this conversation who differed widely in terms of age, nationality, and background. Charles Francois, the elder statesman of the group, was born in Belgium and survived the Great Depression and the Second World War, including the Nazi occupation of his home country. He was a businessman in Congo, Africa, a member of the Belgian Foreign Service, and has lived in Argentina since 1963. (Charles is also the editor of the Encyclopedia of Systems and Cybernetics.) Antonio Caselles is a professor at the University of Valencia, Spain, teaching mathematics, Operations Research, and systems modeling, as well as doing research and consulting. Günther Ossimitz works in the group for Didactics of Mathematics at the University of Klagenfurt in Austria, and has been involved in introducing systems thinking into mathematics curriculum in schools. Fritz Stallinger is a staff member of the Department of Systems Engineering and Automation at the Kepler University in Linz, Austria, and spent several years as a consultant in the automotive industry in Europe. Gary Metcalf was the steward for this conversation group. He is currently an independent consultant, with a background in family systems therapy and work in U.S.-based corporations.

1.2. The Conversation Process

Initial introductions and sharing of ideas was done by way of email, over several months prior to the actual meeting in Fuschl. This exchange resulted in an agreement by the participants to focus on three general examples of social systems: political systems, economic systems, and ecological

systems. Given the very controversial political situation arising in Austria at the time, around the issues of Jörg Haider and the Freedom Party, it was decided that it would be used as a specific example against which concepts could be compared and possibly grounded.

From the beginning, the question of "what is awareness?", and especially, "what is social awareness?", confronted the group. Rather than debate this on an intellectual level though, such as in the context of consciousness or phenomenology, the conversation began with the story of the Freedom Party in Austria, as told by Günther (see section 2). The purpose of this story was to provide a real-life example of a current event on which the group could focus. This was to be an alternative to the typical approach of reconstructing historical events through predetermined models or theories. But as will be shown, this presented many more complications than predicted. And the need for historical grounding became evident from the beginning.

2. Story of the Freedom Party

The Nazi era ended in 1945, leaving much of central Europe in a political shambles. Austria, like Germany, was split into four zones, controlled (one each) by the U.S., the Soviet Union, England and France. But unlike other post-war countries, Austria was able to regain its independence from this occupation in only 10 years, as of 1955. One of the reasons for this success may be related to the development of the system of Proporz in Austria, implying the equal distribution of political and economic power between the two big Austrian parties of the post war Republic: the conservative Volkspartei (VP, "Peoples Party" or the "Black") and the Socialist Party (SP or the "Red"). The Proporz system can be summarized in this saying: for any public office in Austria three persons were needed: one "red", one "black" and one who does the job.

One of the primary issues in 1945 was how to deal with the great number of Austrians who had served in relatively low-level positions in the Nazi regime. Around 1950, the Freedom Party (FP) was founded to provide a place of political identity for former Nazi members, which was needed despite the efforts of the two existing parties to make some "room" within their spectrum for former nazi-sympathizers. Professional associations emerged around this issue as well, such as the "Bund Sozialistischer Akademiker" (Association of socialist academics), which consisted in the early post-war years almost exclusively of former Nazi-oriented scientists, lawyers and physicians. Belonging to such an association was considered a de-facto "de-nazification".

In 1970 the socialist party for the first time gained the relative majority in parliamentary elections. In a secret agreement the new socialist leader Bruno Kreisky convinced the leader of the FP, Friedrich Peter (a former SS officer!) to support a socialist minority government in Parliament. As a "price" for this the socialists granted the FP a change of the electoral law in favor of the smaller parties (which had required, until then, about twice the number of voters for a seat in parliament as the bigger parties). The minority government of the socialist party lasted for just one year. After a year of developing massive welfare programs the socialist party felt itself ready to take over as the absolute majority, which they actually achieved in the 1971 elections. This was also the beginning of Austria becoming both a social welfare and a deficit-spending nation. (In 2000 the public debt of Austria, with 8 million inhabitants, is at about the same level – several hundred billion US$ – as the total public debt of all 52 African nations with more than 800 million inhabitants!)

In 1983 the Socialist Party lost the absolute majority, but this time formed a public coalition with the Freedom Party under the liberally oriented Norbert Steger in order to keep power. But this also removed any clear ideology, causing Austria to become somewhat "politically colorless".

In 1986 Jörg Haider (aged 36 at that time) was elected as the head of the Freedom Party, which then represented only about 5% of voters. As a consequence a coalition was established between the SP and the VP in a "big coalition", representing a majority of over 90% of all voters. In 1989, Haider was also elected as governor of Carinthia, a somewhat rural and poor region of Austria. Here the SP lost their absolute majority in the regional Parliament for the first time since 1945 and the FP and VP agreed upon Haider as governor.

In 1991, Haider was removed from his position as governor of Carinthia due to a comment he made in a political debate regarding employment policies. His statement apparently was to the effect that those persons who refused to work should have their welfare benefits reduced. The response from the SP-leader in the exchange compared such an idea to the forced labor of the Third Reich. Haider reportedly responded, essentially, that at least the Third Reich had an "proper employment policy" ("ordentliche Beschäftigungspolitik"), which was more than the SP-dominated government in Vienna could manage. Despite the possible innocence of the remark, the mere mention of anything related to the Nazi regime still ignites such emotion in Austria that the context or actual intent of the remark was irrelevant. And it was enough to get Haider removed from his position as governor within a week or so. In the meantime Haider has become world famous as "the man who praises Third Reich employment policy", but the political price he paid for it is rarely mentioned.

In 1995 Austria was admitted to the European Union. One of the requirements of admittance was the reduction of Austria's financial deficits. Despite the fact that the ruling SP-VP coalition was unable to balance the budget, Austria's membership in the EU was unaffected – either a requirement with very little "teeth", or one that was of less importance than it was supposed to appear.
In 1995, the VP brought about nationwide reelections, just one year after the 1994 elections in Austria. The main issue was the national budget. The VP wanted massive reductions (as required by the European Union), but the SP refused.

Despite the Socialist Party's victory in the 1995 elections, it nevertheless needed a coalition partner. Since the FP was ostracized by the SP due to Haider's leadership of the FP, a prolongation of the coalition between the two Proporz-parties (the SP and VP) remained. So in the Nineties public debt doubled, and only the so-called "Maastricht criteria" concerning the amount of public debt in any country of the common market in the EU imposed a limitation.

In these years Haider's FP gained more and more voters, most of them protesting against the misuse of power and money by the two proporz partners. The Proporz system was applied in schools, banking, ORF (the Austrian national broadcasting institution), trade unions, chambers of commerce, and many fields of industry and commerce (e.g., power plants, telecommunication companies, residential housing agencies, transportation, and travel agencies). Even the fields of culture and sports were divided between the two big parties. Three of the last five CEO's of the ORF have been former top secretaries in the SP, and the managing director of the biggest hospital in Carinthia (owned by the community of Carinthia) has been a former personal PR-manager of the Carinthian governor. Getting a job as a teacher without becoming a member of a party is almost impossible, as well. In Austria there are no associations of math teachers, history teachers, etc., but associations of the socialist teachers, Volkspartei teachers and FP teachers.

This Proporz system with people in political offices working for their own benefit by mutual agreement upon exploitation of public resources was the ground which Haider claimed to fight against. He appeared like Robin Hood, pretending to take from the privileged and to give to the poor and brave working ordinary people. Haider's political program was always opportunistic, but in the details containing even more ideas of left wing welfare socialism than the SP ever dared to proclaim. This was combined with some right wing "law and order" thinking. Actually he was never pro-Nazi nor explicitly racist in his political argumentation. (As a "learned" lawyer Haider has excellent abilities for provocative formulations, which are judicially intangible, but emotionally highly effective to attract certain groups of people. Haider has many times entered action against people who have accused him of being a Nazi and he has won dozens of such lawsuits in the last decades.)

Haider has never been a Nazi or a fascist, but he has been most effective in giving people with xenophobic and right wing opinions (which officially are "politically incorrect" and thus, so to say, "homeless" in Austria) the impression that the FP is the best party for them to vote.

In 1999, the Freedom Party gained a political majority in Carinthia for the first time, with Haider reelected as governor of Corinthia, confirming his political standing. And by now, the Freedom Party represented 48% of the voting public in Carinthia. In Austria about 27% of all voters voted for the FP in the national elections (as compared to 34% for the SP, and 27% for the VP).

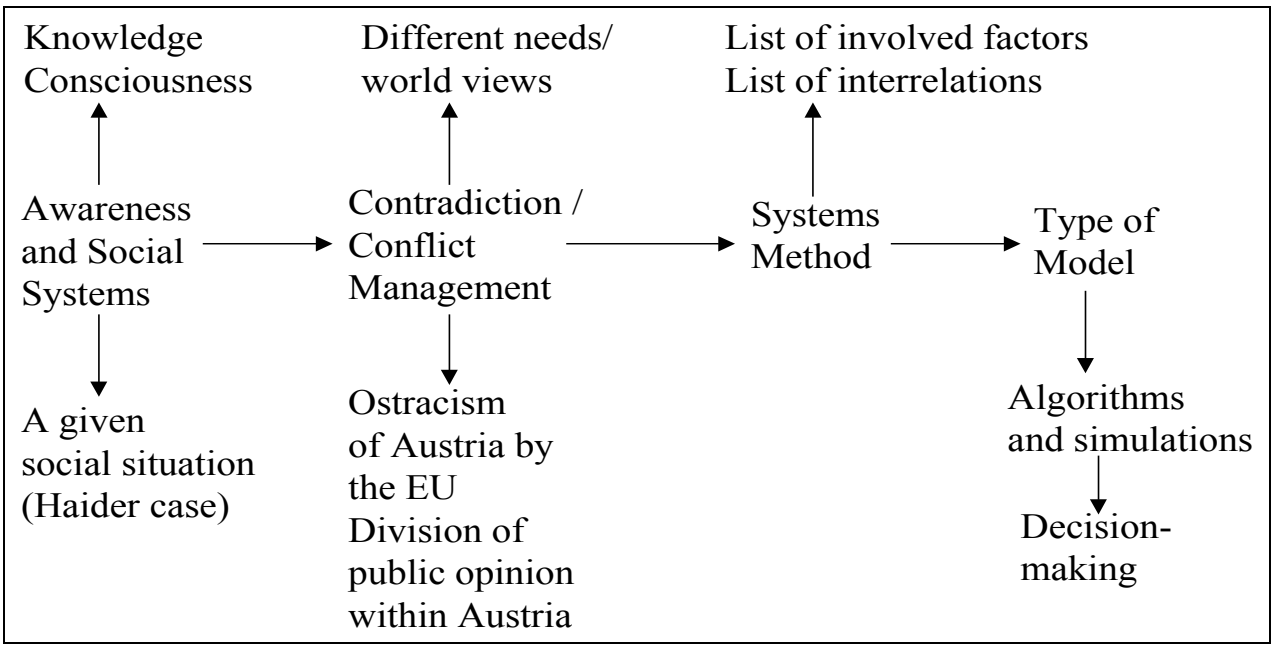
With this initial introduction, the question became how to interpret or try to understand this narrative within the context of awareness of social systems. What could such a story tell the group about social systems in general? At this point, a composite of several models and theories was introduced as a framework for the further conversation: e.g. an overview on initial political models (cp. section 0), a summary of Gerhard Schwarz's theory of conflict solving as prepared by Günther at Charles' suggestion in order to deal with issues of conflict (cp. section 3.2) or the model by Valdemar De Gregori from his work in political cybernetics (cp. section 3.3) as introduced by Charles, when the group continued to explore these theories in light of the Haider case, specifically, and in terms of social systems, most broadly.

3. Frameworks for Discussion

The conversation shifted at this point to investigating initial descriptions of a shared model towards which the group might work. Ideas included the need for such a model to encompass both contradictions and conflicts, to cover varying types of societal problems, to be one that could be "owned" by the stakeholders involved, to include specifics as well as generalities. It would possibly take the form of a framework more than a formal model.

In an attempt to encompass some of the issues from other systems types, as a point of comparison, the conversation also shifted to economic systems. This proved more frustrating than helpful at this point, though, as the discussion quickly moved again to questions of appropriate methods and details of modeling.

In an attempt to capture some of the themes and concepts to-date, Antonio provided a graphic, as shown below:



Further discussion failed to produce any consensus about the factors that were needed for a model, or the appropriate level or type of model that would be adequate for this conversation.

A prototype of Rosen's Modeling Relation was then introduced, as a way to discuss modeling in it's most generic form. Essentially, all models are ways to attempt to represent something, but in the end all are human mental constructs. Ideally, the more accurate the model, the more closely it replicates the functions and behaviors of the "reality" in the world, but a model can never encompass the whole of the reality that it attempts to represent.

The discussion then returned to questions of awareness, and what place it was to play in the conversation. No formal definition had been arrived at, but so as not to allow the conversation to deteriorate to an intellectual exercise about the true meaning of consciousness, etc., the group continued pushing forward wrestling with an attempt to understand the chosen examples. The ideas appeared during this part of the discussion on "awareness" in general and - more specifically – on "social awareness" are summarized under section 4.

In order to try to answer the question of how to deal with apparently different or opposing values, a key insight was reached around the *notion of identity*, and the *need for both commonalities and differences* in order to create this. As these concepts were placed back against the Haider example, a much larger picture began to unfold. There had been a sense by the group from the beginning that the events taking place in Austria, and the attention they had received around the world, could not be understood in isolation. This seemed to become even clearer as the story unfolded and the group was able to gain some sense of *understanding* of the issues from an "inner" Austrian perspective (cp. section 5.1).

Finally, in terms of social systems, two further very interesting ideas emerged from this conversation and were applied to the Haider case. One is that of systemic integrity as outlined in section 5.2. The second concept that emerged was termed reflective systemic properties and is outlined in section 5.3. It proposes the idea that characteristics observed at one level of a system or subsystem may in fact be rooted in a different level of that system.

To interpret or try to understand the above narrative within the context of awareness of social systems several models and theories served as a framework for discussion.

3.1. Initial Political Models

The table below shows a comparision of several initial political models: The first (left-most) column provides three levels of culture as developed by Edgar Schein (1999), whose primary work has been in organization culture. The first two rows of the middle column are from work by Chris Argyris and his colleagues, describing the split between stated beliefs or ideals and behavior. The bottom row of this column is from David Bohm, in the context of his work on dialogue. The column on the far right attempts to interpret these theories within the political realm, in order to create a linkage with the discussion about Haider.

The connections made between the model and political systems, in general, were as follows. In any culture, as described by Schein, artifacts are the physical evidences that can be readily seen by an observer. These can include both what is produced or developed by a group, as well as what is "acted out" through behaviors. The espoused values are the "official" beliefs or ideals as stated by the group, but which may or may not correspond with observed behavior. And the basic assumptions are those underlying causes of behavior that may or may not correspond to the espoused values.

Shein's Culture Model	**Argyris, et al**	**Political System**
Artifacts	Theories in Use	Laws Spending Political bargains
Espoused Values	Espoused Theories	Political ideologies
Basic Assumptions	Necessities (*Bohm)*	Assumed rights

The work of Argyris and his colleagues closely parallels this description in terms of stated beliefs (espoused theories) versus the drivers of actual behaviors (theories in use). In fact, Argyris, et al's work describing a virtually universal separation of beliefs and behaviors goes back several decades (Argyris and Schon 1974; Argyris, Putnam et al. 1985; Argyris 1999). What their research found was that while most people in organizations believed in the greater values of a common good, most people in organizations found it necessary to act according to their own individual gain.

Bohm's work in dialogue provides the basis for the basic assumptions, with his description of the concept of "necessities" (Bohm 1996). (There are many other possible alternatives for this level, of course, from Marx to Freud and beyond, but Bohm's ideas provide a general description of the

concepts rather than a specific theory of causality.) In Bohm's view, necessities represent the beliefs that people experience in the form of fundamental assumptions that operate outside conscious awareness, and that seem like they cannot or should not be questioned. They are typically experienced in terms of emotion more than intellect, and are the basis for most social conflict, often arising as stereotypes about other groups. The importance of this work for this conversation lies in the split between beliefs and behaviors, and the impacts this has on social systems, as will be demonstrated later.

3.2. Schwarz's Theory of Conflict Solving and Aporetic Conflicts

One of the premises of Schwarz's theory is that there are typical forms of conflict, and these are often related to structural situations. Moving from a pair to a trio (a couple having a baby, for instance), introduces natural tensions and conflicts. Similarly, formalizing a group into an organization, in which communication becomes indirect, also results in certain types of conflicts. This can be applied to Austria's political system, which until 1990 had been essentially a two-party system with a third small party (the FP). In 1999 this changed to a situation with three parties of almost equal size (SP 34%, FP 27%, VP 27%, Green Party 9%.) So the situation has changed from opportunities for "twosome-conflicts" to opportunities for "threesome-conflicts".

In terms of conflict solving, Schwarz has proposed a spectrum of six possible solutions, ranging from the most primitive to the most elaborate. The first is simply to *escape* the conflict, such as in running away. The second is *destruction*, in which one kills his or her opponent. The third is to *submit* to one's opponent. The fourth is through *delegation*, which is usually carried out through a hierarchical structure. The fifth is through *compromise*, and the sixth through reaching a *consensus*.

The most relevant part of Schwarz's theory to this conversation was the notion of *aporetic conflicts*. An aporetic conflict must have three conditions: (1) there must be two opposing positions, (2) both positions must be true or legitimate, and (3) the positions must be mutually dependent (one cannot exist without the other).

A typical example of an aporetic conflict is that such as between an employer and its employees. (1) The employer wants more work for less money, the employees want it the other way round; (2) both intentions are legitimate from the viewpoint of each side and (3) both sides apparently depend upon each other.

3.3. De Gregori's Work in Political Cybernetics

Valdemar De Gregori's Work in Political Cybernetics, finally, provides a concept of an Official Group currently in charge, an Opposition Group that represents alternative views, and the great majority of the populace (some 90%) that are labeled the "Don't Knows". Transposed into this during the discussion was work from the original model presented (of culture) that indicated the espoused values of the Official Group representing the official or politically correct view, and the espoused values of the Opposition as representing the views of the opposition, or possibly multiple alternatives in a multi-factional system. Those in power ostensibly represent the official view of "what should be". Political struggles would consist of either trying to push down the opposition or to attract the votes of the "Don't Knows".

4. Ideas and Questions on "Awareness" and "Social Awareness" (Scope of the Conversation)

The following ideas, concepts and questions appeared in the course of the conversation:

Superficial awareness: awareness without understanding (rationality). For instance, panic or Hitler mass meetings.

Non superficial awareness: awareness with understanding (rationality).

- Determination of the value of awareness "for me".
- Recognition of choices (possible strategies).
- Determination of the possible consequences of each choice (a dynamic model needed, at least in mind). That implies: (a) to see "the other side of the curtain", (b) to accept aporetic conflicts, (c) to learn to deal with intolerance and different or opposing values.
- Explicit values. That is, assessment of each strategy.
- A feed back revision process. That is, an "a posteriori" revision of strategies, model and values (values of values, values of model, and values of anything).

When trying to apply this process to the Haider case, it was decided that even beginning to attempt a process of modeling the example would necessitate (1) agreement about a model that would be adequate to the task, and (2) the need for a great deal of detailed information that was simply not available.

Social awareness could be considered a collective process of modeling. Some of the factors and issues discussed in this regard included the following:

- It is not ethical to design a model for others. It implies manipulation.
- The assumptions of "stake holders" underscore the model.
- The principle of delegation (for government) ought to be respected.
- The modeling process reveals a deeper awareness about "stake holders".
- A number of networks of input ought to be created (via the Internet, for instance).
- It is a new way to organize societies. A model is a description of principles (formula or metaphor) of a specific order (it makes order explicit). Exploring alternative models (understanding "others") is necessary. A fundamentalist social system has only "the model", that is, only one way of seeing the world that is considered acceptable. Validation implies fitting purposes and needs criteria.
- It implies dedication to a given social idea and a way to jump obstacles.
- It implies better and reciprocal personal awareness of others.
- It implies participation in a community.
- Confusion is the first step for awareness (as existing assumptions are put aside). Some deficit is a motivation for change. Lack of order demands a new order, perhaps return to the old order.
- Models ought to be necessary and consistent, for basic security in decisions based on it. Changes in consistency lead to new models.

- Social awareness requires trust and absence of fear. Providing examples of other successes helps to create trust and dispel fear. Trust allows suspension of assumptions until a new order can emerge or is created.
- Conflict appears when changes exceed the capacity of those involved to absorb them, when arbitrary rules are imposed, or when there is incongruence between "told" and "made" (between espoused values and those actually in use). Participation and negotiation avoid these types of conflicts. To be fit is a temporary situation (a static model). Adaptability is a permanent situation of evolutionary communities.

What may appear to the reader as somewhat random and disjointed discussions at this point represent at least two difficulties with which the group wrestled. One was the need to bridge widely ranging backgrounds and worldviews (both cultural and professional) amongst the group, in an attempt to find common concepts from which to work. The other was an attempt to move beyond any one preconceived model by which to define the current situation in Austria, and to understand it at a more fundamental level.

5. Findings of the Conversation and Application to the Chosen Example

5.1. The Notion of Identity and the Need for Commonalities and Differences

Triggered by the question of how to deal with apparently different or opposing values, a key insight of the conversation can be seen in the *notion of identity*, and the need for both commonalities and differences in order to create this:

To distinguish a given object, it must be set apart from the things around it. To distinguish a system, there must be some clarity about what is contained within the system (and the commonalities that define the relationships) as well as what the system is not. Set against Schwarz's concept of aporetic conflicts, this creates equally valid realities for various systems, that share commonalities at some levels, and differences at others. In human social systems, people have many more similarities than differences at a biological level, but many distinctions at a cultural level.

In terms of awareness, a distinction was drawn between superficial awareness, meaning simply the perception of another entity's existence, and possibly of it's distinctions, and non-superficial awareness, involving understanding – a sense of seeing "the other" in something of the way in which it understands itself, that is, from within its own sense of identity. To see "the other" in this way requires that one put aside stereotypes and assumptions, and possibly begin instead from what is common. And it is in this way that trust becomes a crucial issue for social systems.

To put aside one's own sense of guiding values (the sense of order that creates meaning for an individual, or the sense of organization by which a system is perpetuated) can be experienced as threatening. And faced with external threats, most people and most systems quickly look for old or existing patterns of order by which to regain stability. But to rigidly maintain an existing pattern of organization, only for its own sake, is ultimately a death knell for a system in a dynamic (evolving) environment. In social systems, it is essentially the definition of "fundamentalist" – a system that can only operate from one static model of reality.

Applied to Austria, its emancipation from foreign occupation within only ten years following the WW II had created a strong legacy of success. But like many legacies, it also created significant barriers to change when the model of success no longer fit the current realities. In this case, deficit spending in order to create a common good, and therefore political stability, could not be maintained. And while this was easily recognized, any ruling party has a strong vested interest in maintaining the status quo, and in protecting its own legacy.

One of Haider's apparent strategies, as used by many skillful agents of change, was to exploit the gap between the ruling party's positions and its actions. The legacy of the Proporz system was the legacy of post-war Austria. It had become so ingrained that it seemed to be a right rather than an economic privilege. And yet continuing the deficit spending necessary to support such a system was fiscally irresponsible and unsustainable, and violated the agreements required by the European Union. As the outsider, Haider did not have to take a consistent and rational position, he only had to point out the inconsistencies of those in charge. (Theoretically, the "shoe is now on the other foot", since the Freedom Party has taken the majority, but Haider has just stepped down as head of the party due to ongoing controversy, once again dodging the possibility of being held responsible for any outcomes.)

5.2. The Concept of Systemic Integrity

The concept of *systemic integrity* was defined as the degree of congruence between the stated (espoused) principles of order (e.g., model or Weltanschauung) and the principles of order by which a system actually operates. Stable systems would seem to show a high degree of integrity, and unstable systems, meaning those in a state of transformation or disintegration, a low degree.

A rather universal example given was that of immigration – an issue facing most developed countries in the world today. While most countries governed by any form of democracy tend to espouse open attitudes towards all ethnic groups, including immigrants, not all immigrants are equally valued. Those who bring valuable skills and can contribute to economic improvements, and those who assimilate quickly into the existing culture, are usually desirable. Those who are likely to be a financial burden and those who challenge existing norms of organization (for instance, those who practice extremely different religions) are not so welcome. It is extremely difficult for any group to live up to its espoused values in total.

From one perspective, Austria is currently facing something of an identity crisis. If it continues to operate according to its own historic system of order, i.e., if it acts according to the basic assumptions that helped create its post-war survival, and does so clearly and publicly, it will reestablish a sense of systemic integrity. But to do so will put it in direct conflict with the espoused values of the larger European Union. Resolving this conflict would seem to require either that (1) the Austrian people be willing and able to release their basic assumptions and "remake" themselves in a new image, or (2) that they reject the assumptions being imposed on them by the EU and remain "true to themselves" (a move that would likely create further conflict in the future). A third alternative, though, might involve a deeper opening of understanding between apparent opponents (an attempt to see "the other", from their own perspective) – to work towards a platform from which more universally acceptable approaches and alternatives might be reached. Admittedly, this is likely to be very difficult in a world political climate where a primary agenda still seems to be the acceptance of guilt for any possible link to former atrocities.

5.3. The Concept of Reflective Systemic Properties

The concept termed *reflective systemic properties* proposes the idea that characteristics observed at one level of a system or subsystem may in fact be rooted in a different level.

In this case, for instance, the controversy around Jörg Haider and the difficulties in Austria seem to reflect much larger difficulties being experienced in many other places. As noted, concerns and problems with immigration is not just an Austrian, or a European, problem. Such a problem is, in fact, rooted in some of the most fundamental issues of commonalities and differences, and how we understand and address these.

If there is any validity to the concept of reflective systemic properties, then it possible that the conflicts represented by the Freedom Party in Austria are very similar to the conflicts that Austria represents for the European Union in a larger way. And if this is so, it is much easier to address Austria as “the problem” than to recognize “the problem” as a pervasive issue of differences in need of understanding and resolution.

6. Conclusion and Framework for Further Investigation

Needless to say, this conversation did not create a final, predictive model of the workings of Austria, or even the one example of Haider and the Freedom Party, as a social system. As a beginning, though, it did appear to open issues that may well prove fundamental to the development of a deeper understanding of social systems, and possibly of the ways in which individuals could become more aware of their participation in them.

As to the issue of awareness, specifically, and its relation to social systems, a great deal more remains to be done. As articulated by Charles Francois, a framework for beginning further investigation might include the following:

- What is awareness? Awareness of what? Whose awareness? Aware of the shades of color in Renoir's painting? Aware of a possible stock market crash in the making, etc.? In our conversation awareness (ours!, or the other's!) was a kind of underlying basement. But it remained implicit; we did not consider the meaning of "being aware".
- How do we pass from "unawareness" to "awareness"?
- What is "being aware”, in a psychological sense? Being passively or actively perceptive? What should be the differences (for example when being in a political meeting)?
- Does perceptive orientation depend on cultural influences, or specific training, etc.? (For example, what caused our attention to be focused on Haider, and to make that issue the very center of the whole conversation rather than merely one of many case studies?
- Is individual awareness different from collective awareness? In which meaning could awareness be "collective"? Are crowds "aware" of their actions, especially when they are criminal? And how does an individual "lose" him- or herself in a crowd?
- What are the uses of awareness? Retrodictive? Behavioral? Predictive?
- What are the conditions to acquire awareness?
- What is the role of the nervous system in instilling in people some specific ways of consciousness (or unconsciousness!) of their acts and their motivations?

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The Evolution of Conflicts

The Conflict Theory of Gerhard Schwarz and its Application to Xenophobia

Günther Ossimitz, Austria

Gerhard Schwarz is an Austrian scientist with a venia docendi in philosophy and group dynamics (Lewin 1947). He has done extensive work in the theory of social groups and organizations. Throughout his writings the theme "conflicts" plays an important role. The first work of Schwarz I personally read was an article titled "Konfliktlösung als Prozess" (Conflict-Solving as a Process B Schwarz 1977). His main scientific work is his book "Die heilige Ordnung der Männer. Patriarchalische Hierarchie und Gruppendynamik" (The Holy Order of Men. Patriarchal Hierarchies and Group Dynamics B Schwarz 1985). The most practically-oriented book is his latest: "Konfliktmanagement" (Conflict-Management B Schwarz 1999). In this summary I will mainly refer to this last book.

Throughout his work Schwarz stresses that different social entities (individuals, pairs of persons, triangles of three persons, groups, and organizations) have typical modes of interaction and **typical forms of conflicts**. One of the main elements of his theory is that there are radical differences in the organizational structures (and the type of corresponding conflicts) when

- a **pair is transformed to a group** of three persons (prototype: a couple gets a baby);
- a **group is transformed to an organization**. This transfer changes the style of communication from direct communication (everyone talks to everyone directly) to the need of formalized "indirect" communication structures (reports, agendas, rules...).

Schwarz gives a classification of conflicts according to the type of social entity in which they typically occur: intra-personal conflicts, conflicts of pairs, "triangle-conflicts", group-conflicts and conflicts of organizations. Although this typology seems to be very plausible and useful to me, I will not attempt to go into detail about it here. For the rest of this paper I will confine myself to Schwarz's theory of conflict solving. For the sake of brevity I will refer to this theory of conflict solving as "the conflict-theory of Gerhard Schwarz".

1. Six Levels of Conflict Solving

The basic idea of Schwarz's conflict-theory is simple. He says that there are six levels (or stages or modes) of conflict-solving strategies, which form a certain order or sequence:

1. **escape:** "run away"
2. **destruction:** "kill your opponent"
3. **submission:** "subordinate your opponent"
4. **delegation:** an independent authority (judge) decides the conflict
5. **compromise:** an arrangement between the two positions
6. **consensus:** seeking for a dialectical synthesis

These six levels form a kind of order or learning process.
This process might appear

(1) as progress in an individual conflict,
(2) as progress in the consciousness of conflicts in a person or organization, or
(3) as progress in the social abilities of mankind as a whole to manage conflicts.

Schwarz postulates a kind of evolution in the ability to deal with conflicts: the most primitive form is simply to run away, the most elaborate form is the art of transforming opposing positions to a new level of synthesis where the conflict disappears.

1.1. Escape

Escape is the most elementary form of "solving" a conflict: if there is a problem, run away. Schwarz sees this as the dominant problem solving method of primitive nomadic hunting tribes: if there is a problem, go somewhere else where things (e.g. deer for hunting) hopefully will be better. B Of course there are numerous modern counterparts of escape as a conflict solving strategy, which would be worth a closer inspection.

The main disadvantage of escape is that the conflict is just avoided, not really solved or even addressed. A modern variant of this habit to avoid painful confrontations is a strategy which has been coined **"shifting the burden"** by Peter Senge (1990). Senge has found that in many social systems (notably organizations) one can find problems which would need a radical solution. A radical solution eliminates the roots of the problem and does not deal just with the symptoms. (Actually the origin of the word "radical" is the latin word radix = root.) Radical solutions are usually painful and unattractive in the short run. They often need to endure a phase of "worse before better". So it happens too often that the necessary radical solution is avoided. Instead, the symptoms are attacked with "quick and dirty" solutions. Think of a person who takes an aspirin against the pain of a damaged tooth, hoping thus to escape a visit to the dentist.

If escape is not effective, a conflict often enters the next stage: destruction.

1.2. Destruction

Both parties of a conflict meet to fight a life-and-death struggle in order to resolve the conflict. Often an escape ends in such a "showdown". When one cannot run away any longer, "high noon" has come. So the prototype of this kind of solving conflicts is the duel. The two combatants shoot at each other. As soon as one of the two has been killed, the conflict is permanently eliminated.

The main advantage of this form of conflict-solving is that the polarity between the two positions is eliminated radically. The main disadvantage is that no learning is possible. This favors a survival of the best "gunners", which might be inadequate for post-wild-west societies.

1.3. Submission or Subordination

This is the more cultivated variant of resolving a fight: the loser is not killed, but only subordinated. The prototype might be a war between two tribes, where the members of the losing side are not killed, but put into slavery. Schwarz sees in the slavery a significant advantage over simple killing for both sides: the winner of the conflict gains labor force for his benefit and the losing side is spared its life.

According to Schwarz the invention of submission is one of the great advances in the history of cultures. It has opened the possibility of specialization and of sharing work ("Arbeitsteilung") among groups. Slave-master relationships have provided the chance for the progressive development of this relation, which is not possible for combatants. Moreover the principle of subordination is the basic building block for the next level of conflict solving: delegation.

1.4. Delegation

Conflict solving by delegation does not require a fight between the two opposing parties of a conflict. Instead , the issue is decided by an independent third party. The prototype of this form of solving conflicts is the lawsuit in a court, where a judge (or a board of judges) decides the case. Schgwarz (1985, 1999) gives several formal requirements, all of which have to be fulfilled in order for conflict solving by delegation to work properly:

1) The conflict must be of a kind that there is a right and a wrong solution.
2) A higher authority, which is accepted by both sides, must exist and this authority and its decision must be unquestionably accepted by both sides.
3) This independent authority must be able to discern between the right and wrong solution.

The first requirement is most certainly not trivial. We will see later in section 1.6 that there is an important type of conflict (which Schwarz refers to as **aporetical conflicts**) that do not fulfill this requirement. The second requirement is trivial, yet it has tremendous practical importance. Without a concept of an authority, which is accepted by both sides, conflict solving via delegation is impossible. The third requirement is rather straightforward: if the higher authority chooses the wrong alternative, we cannot consider this as a proper solution of the conflict.

Conflict solving via delegation has an institutional counterpart: the **hierarchy**. Schwarz stresses a close connection between the emergence of conflict solving by delegation and the emergence of hierarchies. Both the second and the third requirements from above are granted in hierarchies *per definitionem*. We have just to consider the fundamental law of hierarchology "*' 1: The boss is always right*". In a hierarchy the choice of the boss becomes "right" or "truth", just because it has been decided by him or her as the higher authority.

Schwarz gives an excellent example of the close relation between conflict solving and hierarchies by citing an episode from the Old Testament. In Second Moses, Chapter 18, Verses 13-27 it is reported that Moses, the leader of the people of Israel on its journey through the wilderness to the promised land, was overwhelmed by the many controversies he had to decide among his people. Jitro, his father in law, suggested that Moses should elect trustworthy men as overseers over 10, 50, 100 and 1000 people among the families and tribes of Israel, so that they could solve all the minor issues. Only the most critical cases should be brought to Moses as the highest authority. Moses did so and thus installed a hierarchy with the purpose of solving the conflicts among the people. It is most interesting that immediately after this in Chapter 20, God gave Israel the 10 commandments at the mountain Horeb. Schwarz interprets this in the following way: The 10 commandments were given as a set of rules for the overseers (judges) of Israel. He stresses that any hierarchy needs a set of formal rules or laws or codes which insure that the hierarchy can fulfill its vital functions.

Schwarz sees in the hierarchy and the underlying principle of conflict-solving by delegation one of the

most fundamental and successful achievements in the evolution of human societies. Over thousands of years the hierarchy B the "holy order" B proved to be one of the most efficient and powerful ways to structure organizations. Schwarz thinks very generally that social entities are institutionalized answers to major conflict themes, and act as institutionalized methods of conflict-solving.

1.5. Compromise

A compromise is different from delegation. The Viennese saying "We won't need a judge" ("Wir werden keinen Richter brauchen", which is said when two parties agree to manage some issue themselves) indicates the issue very precisely: the two conflicting partners agree that they want to find a solution themselves without an external judge. Usually a compromise is somewhere in the middle between the original opposing positions. Wage agreements between trade unions and employer associations are a typical example. First the trade union says: "We request +4.5% to the income of every worker!"; Then the employer's association says: "We offer 1.3%" B and after some weeks of ritualized negotiations both sides agree to, for instance, +2.8% plus other special agreements that each side can present to its own members as a success in the negotiations.

Another example for conflict solving by compromise is bargaining at an oriental bazaar about the price of some article. A theoretical requirement for successful compromises is that there exists a common scale on which the difference between the two positions can be measured. At the bazaar this is simply the price to be paid for a certain item., In the case of wage agreements it is usually some absolute or percentage increase in the wages of employees.

1.6. Aporetic Conflicts

The need for this sixth conflict solving strategy exists because there is a type of conflict that cannot be solved through any of the previous methods: this is the **aporetic conflict** or **apory**. A conflict has to fulfill three conditions in order to be called **aporetic**:

(A) There must be two opposing positions.
(B) Both positions must be true or at least legitimate.
(C) Both positions must depend upon each other; one cannot exist without the other.

Condition (A) is trivially necessary for any conflict. Condition (B) is definitely non-trivial. It makes clear that aporetic conflicts cannot be resolved by the means of our conventional true-false logic. In particular, aporetic conflicts are not solvable by delegation. According to the first condition, in delegable conflicts only one side can be right and the other must be wrong. B This is not the case for aporetic conflicts, where **both** sides are "right".

Yet condition (C) is the trickiest aspect of aporetic conflicts. It says essentially that both opposing positions are necessary: no side can exist without the other. Thus a primitive elimination of the conflict (e. g. by destruction of the opposite position) is actually impossible, because it would ultimately result in the elimination of both sides. In order to understand this, let us imagine a strike as a weapon of workers against their employer. If the workers strike too extensively, the existence of the firm is in danger: the firm might lose its market-position and its revenues. The management would have to quit the business and to close the plant. Thus a strike cannot be extended *in extremis*, because of the aporetic relation between the employer and employee side. For the same reason the management cannot fire its whole workforce, because it depends upon them, too.

Another very fundamental apory discussed by Schwarz is the **relation between freedom and law** or **freedom vs. order** in a societal entity: (A) Both positions are opposed to each other: laws like "It is

forbidden to enter the lawn" obviously reduce our freedom. (B) Both positions are legitimate: order without freedom would be brutal dictatorship and slavery; and freedom without "law and order" would be just anarchy. (C) Both positions depend upon each other: in order to grant freedom, some kind of order is necessary (e.g. in form of a constitution which grants the right of free speech); on the other hand some kind of freedom is necessary to establish "law and order". Just for this reason the pilgrim fathers had to leave their home countries and went to America: there they had the freedom to establish a new, democratic order.
The apory between freedom and order appears also in hierarchical organizations: how much autonomy and freedom does the administration give to the employees in their realm? On the one hand centralized regulations are necessary to keep the hierarchy functionally alive (think of the "10 commandments" for Israel!); on the other hand the employees need some freedom within their position in order to organize their work effectively. Any hierarchical organization has to balance this aporetic ambivalence between centralized regulation and individual freedom at the forefront of a business.

2. Progress in Solving Conflicts

2.1. Fundamental Apories

When I heard first about aporetic conflicts, my reaction was that an apory must be something very strange and extraordinary. Over the years I have learned that the opposite is true. Actually some of the most fundamental polarities of mankind can be seen under a conflict-theoretical perspective as apories. Schwarz mentions four fundamental aporetical polarities: life B death; individual B group; young B aged; men B women. For each of these polarities some aporetical aspects can be identified.

Schwarz has a very interesting (yet debatable) hypothesis about these four basic polarities. He asserts that it is a fundamental function of hierarchies to overcome any of these four apories. The conflict between the young and the older is resolved by the fact that in a hierarchy people have to work their way upwards.; This implies that the older people have the higher positions and thus rule over the younger. The polarity between individual and group (or institution) is resolved by the fact that each individual in a hierarchy can be replaced by another; only the institution has to remain stable. Schwarz interprets this as the dominion of the institution over the individual. The conflict between men and women is resolved in hierarchies through the fact that (according to Schwarz) hierarchies in their purest form are just hierarchies of men (see the book-title "Die Heilige Ordnung der Männer B The Holy Order of Men; Schwarz 1985). Women are principally excluded from this (proto)type of hierarchy. The last basic polarity between life and death Schwarz sees as resolved in the following way: In hierarchies rules and regulations continue to exist even if the individual person dies or has left the hierarchy. Thus the "death" rules over "life" in a certain sense.

Personally I think these analogies are interesting, but possibly a bit too far-stretched. Yet I would like to stress that Schwarz addresses here a very important question: *What is the function of organizations and institutions concerning our desire for getting aporetical conflicts (re)solved?* As an example I personally think that marriage is an institution which has the function to overcome the aporetic polarity between men and women. This does not mean that I think that any apory can be resolved on earth. To resolve the polarity between life and death in my opinion requires concepts like eternal life in heaven and something like the resurrection of the dead; which surely transcends our earthly realms.

2.2. Apories Institutionalized

What I gain from Schwarz is the fact that aporetical conflicts can be "institutionalized", which means that a certain organization or institution is formed with the purpose that the apory or conflict is well enclosed within the organization. These aporetic conflicts embedded within an institution are not just a mere problem or something that is inevitable. On the contrary: the existence of this kind of conflict is a fundamental reason why the institution exists at all! Schwarz discusses in detail the example of an insurance company. During a consulting process in an insurance company Schwarz noted first an **apory between the sales personnel** (who promised the customers all and everything just in order to sell the insurance policy) **and the casualties department** (who had to say too often to the customers "Sorry, that kind of accident is not covered by the terms of your insurance policy"). The aporetic relation of both departments is obvious, especially the fact, as noted in condition (C), that both need each other. But this is only the first level of apories that Schwarz discovered. On an even more fundamental level the **mere product "insurance policy" has an aporectic character** on a psychological level.. On the one hand the policy is contracted, because accidents can happen. On the other hand, Schwarz found that there is a strong belief among customers that signing an insurance policy psychologically has to do with the wish to **avoid** an accident or catastrophe. Schwarz compares insurance fees with biblical sacrifices, where people voluntarily killed an animal in order to ensure their protection from more serious occurrences. The slogan of an Austrian insurance company "*Ihre* Sorgen möchten wir haben" ("We want to have *your* troubles") addresses exactly this second desire of customers: to get rid of casualties by an insurance policy. Schwarz reports that the conflict between sales personnel and the casualties department was accepted much more readily when the insurance people became aware of the fact that even their product has aporetic aspects about it.

Schwarz sees such aporetic aspects not only in insurance policies, but also in familiar things like telephones, private cars or money. For details see Schwarz (1999) chapter 6.

2.3. Dealing with Apories: a Dialectical Process

Schwarz provides some theoretical guidelines about how an aporetical conflict can be treated. He thinks that such a conflict often evolves in several steps, which have a typical sequence (although relapses to earlier steps are usual):

(1) The conflict emerges: the two opposing positions arise and become apparent.
(2) Fight: destruction or submission?
(3) Both sides recognize that they would destroy themselves if they killed the opposite side.
(4) Attempts are made to reach compromises.
(5) The polarity appears within both opposing sides.
(6) The synthesis: both sides find a new balance on a higher level.

Phase (1) implies that the conflict is no longer kept "under the surface". In phase (2) both sides try to "win" the conflict. This is impossible, because in an aporetic conflict both opposing positions depend upon each other and thus no side can eliminate the other. At some point, phase (3) is entered. If the elimination of the opposing position is impossible, usually a *modus vivendi* arises, and a compromise is looked for (phase 4). The search for compromises must fail, because aporetical conflicts do not involve differences which can be measured on a common scale, where both sides can meet in the middle. There is no common scale and therefore there is no middle that can be found; for instance, where could there be a middle position between men and women or life and death? The key for a successful management of aporetic conflicts comes in phase (5): each side discovers that the opposing position can be found

"within their own camp". At this stage dissidents are revealed, which make clear that one's own position includes somehow the opposite position, as well. If we denote two opposing positions as A and B, then the people of camp A recognize that position B is among them, and the people of camp B see position A emerge within the own camp! At this stage an aporetic conflict becomes truly interesting and constructive. In a struggle between the polarities of freedom and order (at least some of) the people of the "law and order" camp would cry for more freedom and the people of the "liberty" side start to ask for order and regulations in order to save their liberty! This opens the door to a new way of living (phase 6), where both positions are equally represented in both camps and thus the polarity vanishes.

These six steps should be taken onlyas an idealized and simplified model. In reality it well might happen that drawbacks from a more advanced phase to an earlier phase take place. Moreover I think that for some of the most fundamental apories we will not be able to reach a synthesis level (6) in our earthly lives.
Concerning the progress in the original six levels of conflict solving (described in 1.1. - 1.6), Schwarz believes that progress to a higher level of conflict solution can only be achieved if there is insight by all conflicting parties that the new level would bring more advantages than disadvantages. There must be an expectation that something essential can be gained by the progress to a higher conflict solving level. If a dictator has more advantages in continuing his brutal regime, he will never be willing to allow democratization.

3. Xenophobia: a Special Apory

3.1. Different Forms of Xenophibia

Let me define **xenophobia** as a fear or hatred against someone or something that is strange or different than oneself. A necessary condition for xenophobia is that the mere fact of being different alone is sufficient for the negative feelings. For a xenophobe it is not necessary that the other person behave in a peculiar way. Being different is sufficient reason to create conflict.

This broad definition allows the inclusion of different variations of xenophobia:

Rascism := hatred against people of other races and/or other cultures.
Sexism := hatred against the opposite gender, usually hatred of men against women.
Fascism := hatred against an opposing political opinion. etc.

3.2. Xenophobia and Apories

The fields where the different aspects of xenophobia arise seem to be of aporetic nature. Let us look at this hypothesis in more detail. In the case of sexism, i.e., hatred against the opposite gender, Schwarz (1999, pp 96ff) says that the relation between the sexes is one of the most fundamental (but not yet properly addressed in our western societies) apories of mankind. To determine the aporetic nature of the relation between different races is not so difficult, either: different races usually establish different cultures, which result in differing norms and behaviors. So we can conclude that there are different cultural positions within different races, which is the first theoretical requirement for a conflict. Moreover all these different cultures are legitimate, because any culture is part of the identity of this "ethnos". As a third point we find that ethnic or biological differences are actually necessary to identify

a culture or race. If all races except one would be eliminated this would let vanish the concept of race itself.

This last point might be better seen within the field of fascism or political differences. If all political differences and any political opposition were eliminated, politics itself would cease, being downgraded to a crude authoritarian dictatorship. The existence of different political opinions and political parties are considered an elementary requirement for us in order that we can speak of (democratic) politics at all. This implies that opposing political opinions depend upon each other in a certain way. It is not possible to eliminate opposing political opinions without killing the very essence of non-monocratic politics itself. The second requirement of an apory, that both opposing sides are true or legitimate, is a crucial point in our pluralistic view of politics, too. So we can conclude that our pluralistic democratic style of politics is in its very essence of an aporetic nature.

We can also conclude that important variants of xenophobia (racism, sexism ...) are of an aporetic nature. With this background xenophobia can be interpreted basically as an attempt to avoid or to get rid of aporetic conflicts by trying to eliminate the opposing position. Since the desire for harmony and unity is a very strong emotional force in humankind, this offers an explanation why xenophobic behavior might be so massive.

Moreover we have to take into account that apories are actually opposing our common "yes-no" or "right-wrong" logic. According to binary logic an apory should not even be allowed to exist! Being confronted with an apory is a scandal for our dualistic logic. Accepting an aporetic situation implies the acceptance of something that is basically illogical. Xenophobic fighting against an apory thus can be justified with the argument that its intent is to defend rational logic! This gives a clue why xenophobic arguments are so often very catchy and hard to deal with in a logical discourse.

3.3. Standing against Xenophobia

These considerations show that standing against xenopohbia is not so simple. Xenophobia cannot be eliminated as simply as darkness can be eliminated by switching on a light. Crude anti-xenophobia is in massive danger of becoming xenophobic itself. An 'anti-fascist' saying that "All fascists have to be imprisoned in concentration camps" argues himself like a fascist.

Paul Watzlawick's concept of **first-order change** vs. **second-order change** (Watzlawick/Weakland/Fisch 1974) is a fine theoretical frame for evaluating strategies against xenophobia. With the terms *first-order change* and *second-order change* Watzlawick coins two essentially different styles of solving a problem. First order change means that a problem is tackled directly in the following manner: if the problem increases, the proposed intensity of the solution has to be increased, too. If it is getting colder, increase the heating. If you need more money, withdraw more from your bank account. If you get hungry, eat more. If your car is too slow, step on the gas. If somebody does not understand you, speak louder. For many simple problem situations first order solutions are perfect.

Yet Watzlawick shows that there are numerous types of problems where first-order solutions are disastrous. When another person does not understand our language, it does not help to speak louder. We have to change the language to make ourselves understood. If the glass in the windows of a house are broken, more heating would not suffice to prevent the cold. It is necessary to repair the windows to fight the cold efficiently. When the brakes of a car are blocked, it is not a good idea to "solve" this problem by just opening the throttle. This might overheat the brakes and in the worst case this could

inflame the whole car. The proper solution would be to loosen the brakes. Such **second-order solutions** are usually not like pulling a lever within the system but a change of the structure of the system itself.

In aporetic situations first order-solutions generally don't work. On the contrary: they usually worsen the problem and not infrequently are found to actually be the problem. Watzlawick (1974, chapter 3) summarizes: "More of the same - or: When the solution becomes the problem". The arms race between the USA and the former Soviet Union is a good example for this principle. Every side just "reacted" to the increase in armaments of the other side. This first order solution "more weapons against the threat" actually **was** the problem, as can be seen easily from a second - order viewpoint.

First order solutions are not suitable for xenophobia, either. They just lead to a destructive escalation of the conflict. What is true for aporetic conflicts in general, can be applied to xenophobic constellations in particular: Don't try to eliminate the tension by brute force and resist simple first order "solutions"! At first sight this is considerably more difficult than just hitting against the opposing position, but this is the price we have to pay for a successful management of xenophobia.

4. Resolving Xenophobia

As for any aporetic conflict, there is no quick solution for resolving xenophobia. I have already pointed out that simple fighting against xenophobia on the level of a "first order solution" definitely would not help. Simple opposition against xenophobes is itself a kind of xenophobia against the xenophobic! To make a second-order solution possible it is necessary to resist the simple first-order fighting. And this decision is usually painful and often it has to some extent the character of a sacrifice. Sacrifices are not very popular in our days, but they may actually have the power to transform vicious cycles to virtuous cycles. Let me make the point clear: here "sacrifice" does not mean something mystical or even theological, but it means the simple fact of "worse before better", as it has been coined by Senge (1990). For having the chance of achieving some long-term beneficial effect we have to bear a short term disadvantage. Saving money with interest is a very elementary and practical example for this principle: One spends less money today for a future benefit, which is higher than the present disadvantage. The same is true for any form of business investment: first we spend some considerable amount of effort, time or money in order to achieve a later "return on investment".

I have the very strong impression that overcoming xenophobia requires some sacrifice – or some essential kind of "social investment", if you like; but it is hard for me to argue on the level of rationality here. I have thought very hard about what one might have to "put on the altar" to overcome xenophobia. I must admit that I have no rational argument to this question in my head. I have only an answer in my heart - and it is not very comfortable to me: My heart says that we have to sacrifice nothing less than our own positions, our view of this world ("Weltanschauung") - our own "truth" about the things we believe as the "facts" of this world to overcome xenophobia. At the very bottom it seems to me that the mere fact that each of us is the creator of his or her own world (as this has been proposed by the Radical Constructivists, like Paul Watzlawick, Ernst Glasersfeld or Heinz von Förster) is the seed of all this fear (i.e,, xenophobia) of the things and persons and idea(l)s out there, which apparently are different from us and which are terrifying us, because they are somehow a danger to our identity. If we want to reach a higher level of a synthesis, these differing positions and world-views have to be sublimated and dissolved. It is like an egg cell which has to allow a sperm cell to penetrate the cell boundary: without this readiness to lose its own identity no fertilization, no synthesis of a newly created living being is

possible.

Again: "to sacrifice of my own position" is not presented here as a rationally argued answer to the xenophobia issue. Seriously speaking I consider this just as the edge of a systemic answer, which is far from fully unfolded in my mind.

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Group 4

Design of Disciplined Inquiry on the Foundation of Information Science

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Signs, Information, and Consciousness

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1. Introduction

The objective of the conversation was to discuss the foundations of information science in a broader socio-technical context. Based on Søren Brier's book manuscript *Cybersemiotics – a Trans-Disciplinary Framework for Information and Communication Studies* (Brier 2000a) the group began the discussion on the limitation of the information-processing paradigm.

The problem of the nature of information takes on a protean aspect when one tries to tie it down. The principal reason seems to be that the word *information* is used in a wide variety of contexts that on the surface seem to have something in common, but on closer inspection turn out to be disparate. What these contexts have in common is that they all deal with perception and communication of knowledge, facts, or data of some form or other, and the actual or potential transmission of this knowledge, these facts or data, from one location to another, or from one person to another. In other words, perceiving, storing, and transmitting are essential to any idea of information. Often, the additional element of *processing* is involved—the transformation of information from one form to another and the change and manipulation of information.

The notion of information as something sufficiently real to be measured and quantified, and not simply as a vague reference to a list or collection of facts—for example, "Here is a list with information about what to get at the grocery store"—originally came about with Shannon and Weaver's (1949) mathematical theory of communication. This theory resulted from two problems: a) the question of how much of a message really had to be transmitted in order to be able to re-create the original message and b) the question of the influence of noise (errors) on the ability to re-create a message. Some method was required to quantify the amount of data, or information, that could be packaged in different types of communications and sent across any of a variety of channels from a transmitter to a receiver. Among other things, these theorists were originally interested in practical problems such as how many phone calls could be packaged into a single trans-Atlantic cable, or how efficiently a radio transmission can be made to carry a conversation between a sender and receiver. The quantitative specification of information was almost secondary to this communication problem, but soon became important to the whole range of developing cognitive

sciences such as artificial intelligence, computer design, linguistics, the investigation of human memory, and the quest to understand the structure and function of the nervous system.
Shannon and Weaver's approach to information is based on the reduction of uncertainty. For this reason it is most successful in applications where one can point to a specific set of symbols, such as letters for numbers, and specify how their range is delimited to particular choices—in other words the open probabilities reduced—by the specific message that is sent. For instance, a signal sent from a computer to a printer specifies a particular symbol, usually a letter, to be chosen and printed out of the small universe of all letters or symbols that the printer is capable of producing. In such a situation it is easy to calculate a Shannon-Weaver quantity of information for any particular letter, and specify its transmission rate.

Of course, once one gets the idea of information in mind, it seems to suggest something beyond probabilities and the reduction of uncertainty in particular symbol sets. Speaking informally, information seems to have something to do with the reduction of disorganization or *chaos*, creating a situation of increased *order*. One might say that there is considerable information in nature itself, for example in the shape a flower or the pattern of a galaxy. In this case, few would mean that the flower, or galaxy, represents the reduction of uncertainty in the organization of all possible patterns of flowers or galaxies to a single instance. Rather, we notice the remarkable *order* in all aspects of the natural world, an order that the ancients Greeks expressed in the work *kosmos*.

One might further think that order is the opposite of entropy, or disorder. Thus, as early as 1929 Szilard suggested a converse relationship between information and entropy, harkening back to Boltzmann's thermodynamics (Boltzmann 1896), or statistical mechanics. Shannon and Weaver, in fact, referred to entropy in their own work as well, mainly because of similarities with the equations that dealt with statistical events—equations originally written to describe the outcomes of games of chance. But it was Norbert Wiener (1961) who took the full step and declared that information not only is not matter or energy, but that thermodynamic entropy is the opposite of the statistical concept of information (Brier 1992). Information was thus defined as neg-entropy. This approach was later followed by Scrödinger in his 1967 book *What is life?*, later by Ruesch and Bateson (1987), and finally by Tom Stonier (Stonier 1997). The rather amalgamated result of all this was a second notion of information, namely that as the opposite of entropy it could be understood as order in the face of disorder.

From this perspective, for instance, Prigogine's (Prigogine & Stengers, 1984) self-organizing "systems in the third state" can be seen as gathering not only organized energy, but also information, and simultaneously dissipating disorganized energy or entropy. Thus, the concepts of energy, order, and information, on the one hand, and entropy, disorder, and loss of information on the other, became irrevocably entangled. We are left with the sense that information has something to do with patterned organization and the reduction of uncertainty and the interpretation of what is 'behind' the wast amount of data which overwhelm us today. But how can such a vague notion be applied to the vast realm of questions dealing with the creation of form and the nature of discourse?

The limitation of the quantitative information processing paradigm and the influence of a strong AI research program in dealing with the meaning aspect of human language communication were discussed, especially from the viewpoint of syntax versus semantics. It was agreed that a true transdisciplinary theory of information, cognition, and communication should be able to encompass not only technical communication (cf. Shannon's theory of communication) but also animal sign communication and human communication through language. The discussion of what actually

constitutes a language, revealed that social sciences and computer sciences seemingly use different definitions. We specially concentrated on natural languages; they demand not only a generative and context-sensitive syntax but also context-sensitive semantics that usually cannot be isolated from their pragmatic aspects. It was pointed out that basic characteristics of biological systems like autopoietic structure and motivational mental processing seemed necessary to establish any kind of semantics. But the motivational structure of living system alone seemed not to be sufficient to establish a meaning-structure at the conscious level. So we found it necessary to include the psychological and social level of intentionality including motivational ordering of embodied metaphorical concepts.

We established that the understanding of messages could not start with an objective concept of information in nature but as a prerequisite has to include humans in a social structure comprising a body and psyche with inner (emotional) life. The group's attention was therefore directed to the discipline of semiotics that deals with how signs get meaning in the context of living and social systems (biosemiotics).

Recently, Bazewicz (1998) has made a significant contribution toward clarifying this situation. He considers information as a "*process* with energetical and communication character." Bazewicz utilizes a systems theory paradigm, one in which the form of the information process changes with increasing levels of system complexity. For example, at the ground level is found the traditional Shannon-Weaver type of information, embedded in some physical platform such as a radio computer chip. Out of this come transfer and communication operations in which the information is moved from one location to another through a channel. Also allied with this level are information processing operations such as computations in the computer chip that alter the form of the information there. Above this level are information processes associated with organisms, such as complex metabolic activities within cells, or the organization of hormonal processes throughout an organism. Beyond even these are intellectual information processes associated with info-energo-dynamical operations, for example in the brain, that concern themselves with knowledge and meaning. Moving up through this system there is an increasing relevance of informational processes to whole system considerations, and the environmental contexts in which they occur. The highest levels can be thought of in terms of cognitive and even social operations. An important question, here, concerns the connections between different information levels. Are the different levels qualitatively different from one another? Do the higher levels emerge from the lower? Which way does causality flow? Would an ontological background theory based on chance and chaos theory give a better framework to solve the problems (Brier 1997, Combs 1996)?

2. Conceptual Levels of Information

The present paper continues along these general lines, seeking a broad overview of the nature of information, one that seems fully compatible with both its technological and human aspects. To do this, we seek an overview that includes not only probabilistic and energetic aspects of the general notion of information, but also the human experience of meaning. To this end we suggest the following tripartite approach, specifying three levels of information that on the face of it seem to build on separate epistemological grounds, but which later we bring together in a unifying framework.

Level one corresponds to the traditional Shannon-Weaver notion of information, derived from their theory of communication. Its format is well known, made up as it is of a transmitter, a receiver, and a channel that connects the two. Transmissions are necessarily of an energetic nature, though quantities of energy tend to be small and their importance is secondary to the reduction of uncertainty that accompanies the transmission of information from one location to another. Here, the efficiency of information transmission is directly tied to the efficiency of the method by which information is encoded. Natural languages, for example, are highly redundant, and thus inefficient to transmit, though necessarily they are highly reliable. This model allows not only for the quantification of the information transmitted over a channel, but also the quantification of quantities of information not actually transmitted, by considering the reduction of uncertainty that would be involved in acquiring such information. Note, however, that the latter requires a tacit notion of communication. Also note that such encoding is not so much reliant upon energy itself, but is interpreted from a higher level up.

Level two introduces the concept of *meaning*, understood biologically in the context of *signs*. Here we are concerned with the encoding of mental concepts and how they are communicated between individuals and within the mind. In human history, the earliest instances may have been achieved through mimicry and ritual behaviours that communicated important behaviors and skills within small tribal communities (e.g., Donald, 1991). Later, primitive drawings and pictures may have served the function of communicating ideas within and between generations. Eventually, of course, natural languages took over a large part of this function, and in time they came to be transmitted through writing. Thus, at level two the encoding for transmission of a concept through mimicry, pictures, or words, sets the interpretive frame for an energetic information process at level one. In both instances the encoded information can be transmitted to a receiver, or another person in the case of level two, and stored locally in the hardware, e.g., of a computer, or in an individual's memory. Of course, we suppose that memories, though they come to us in mental forms, are dependent on the wet ware neurology of the brain, thus completing the parallel between levels one and two. But we believe that this does not dissolve the epistemological distinction between them.

The second level actually opens a whole new landscape in which syntax, linguistics, and especially semantics (e.g., Hardy, 1998) take precedence over considerations of probabilities and energy. At this second level we enter the human realm of thought, discourse, and language. A concept in the mind may well correspond to the activation, for instance, of a particular bundle of neural elements in the brain (Edelman & Tononi, 2000), but cannot be reduced to it. Thus, in our tripartite scheme a concept in the mind represents a connection downward to neurological coding at level one, and events in human consciousness at level three, which, as we will see shortly, is necessary for a genuine language.

The *third level* represents consciousness. It may seem curious to think in terms of consciousness as information, but consciousness is the stage on which sensory, emotional, and cognitive events play out their roles, great and small, in the human mind (Baars, 1997). Each can be characterized in terms of its own individual shape or form, and each is imbedded in the larger context of moment-to-moment experience. There are many descriptions of consciousness in relationship to underlying activities in the brain (Combs, 1996). Most of these emphasize at least two basic types of consciousness, one that addresses sensory and motor events, emotions, memories, and perhaps simple cognitions, while the other concerns language, complex cognition, and especially the ability of the organism to reflect upon itself (e.g., Eccles, 1969; Sperry, 1994). Eccles and Sperry referred

to the latter as "higher consciousness," while Damasio has recently referred to it as the most sophisticated form of "extended consciousness" (Damasio, 1999).

Since Damasio's description of consciousness seems particularly useful to this discussion we will describe it in a bit more detail. Damasio's understanding of consciousness builds on a phenomenology of a body in which a basic sense of physical presence is built almost unconsciously out of the most fundamental neural mapping of the sensory and motor events of the body itself. This basic sense of physical presence is termed *core consciousness*. Sensory experiences such as taste, seeing, and hearing, map themselves onto this core consciousness, clothing it and making us aware of it. Memories can also play this role because they contain sensory and motor representations that present themselves in the context of the core consciousness, just as did the original sensory events that engendered them.

Extended consciousness, according to Damasio, combines the elements of core consciousness with more complex cognitive operations, especially language and concept formation, to create an extended sense of time and space, allowing a person to live in an experiential world that reaches beyond the immediate here and now of core consciousness. It also makes possible the creation of complex concepts and self-reflection. A complex concept may contain within itself complex linguistic elements, memories, emotions, and sensory and motoric imagery, all combining to create its *meaning* (Baars, 1997; Hardy, 1998). We return to these ideas below.

3. Peirces Semiotics of Firstness, Secondness, and Thirdness

Here we suggest a view of the nature of information that holds the possibility of embracing all three of the above levels. But as we find it difficult to see how the various levels could give rise to each other in a causal way, we do not start with an objective concept of information as data or facts etc., but rather emphasize the human aspect of information and communication, bearing in mind the human contexts of body and mind, and the fact that humans interact with each other in social situations as the base situation for the production of information including scientific knowledge. We approach all this through the pragmatic discipline of *semiotics*, which deals with how *signs* acquire meaning in the context of human situations. This line of attack was originally pioneered by the inventor of pragmatic semiotics, the American logician and philosopher Charles Sanders Peirce (Peirce 1931-56 and 1992). His system is based on a revision of Kant's philosophy, but unlike the latter's mind-based categories, Peirce's categories span mind, nature, and cognition. Peirce's articulation of communication and meaning begins with three general categories termed *firstness*, *secondness*, and *Thirdness* (Brier 1999).

Contrary to Kant's mind-based categories Peirce's categories each represents a fundamental aspect of mind and nature and cognition. Special interest is that Firstness represents qualia and feeling as a basic feature of reality existing by itself in an unmanifest state. Objects are only secondness and they are considered along with force and will as constraints on our perception of reality. Thirdness represents mediation between firstness and secondness. It is the habits of nature and mind that leads to understanding. The process of semiosis (signification) is modelled over this scheme, where the primary sign or the representamen (firstness) refers to the object (secondness) through establishment of an interpretant in thirdness. Let us explain these conceptions in somewhat greater detail.

Firstness represents immediate experience before it is examined by the mind, even before it develops into a complete and formed perception. It is the instant of pre-examined experience that

precedes all reflection or consideration. What philosophers call *qualia*, basic unexamined sensations, are examples of firstness, as are feelings and emotions that have not yet caught the mind's reflective eye. This aspect of experience, especially as it is referenced to the body, is a basic feature of reality as it first emerges into consciousness. In this sense, firstness is the essence of core consciousness, of which we have only the vaguest direct awareness. The experience of firstness may carry important information, as it does when we have a vague sense that a situation is going well or perhaps is going badly, or that an idea is correct or incorrect, but until it evolves into secondness and thirdness we cannot say exactly what it is that we feel.

In *secondness* our experience has formed the perception of an actual resistance, which might later be identified as volition, a pattern, a force or the solidity of some material object that is the source of the sensation or feeling that first presented itself an instant earlier as firstness. For example, the taste of something hot, liquid, and tasty, felt on the tongue, but not yet resolved into the perception of hot tea. A vague uneasy feeling in the chest and throat, resisting an intended act that may be later recognized as guilt. The object that we hit, which we later–after regaining consciousness–recognizes as a car. Peirce noted that in secondness we confront the solidness of an object which is no longer at the vague edge of consciousness but asserts itself upon our senses in terms of its own objective properties. Secondness lies at the threshold between core consciousness and extended consciousness. It represents reality asserting itself upon us with its own relentless presence, but precedes any reflective consideration of its properties. When we examine informational processes in nature, for instance the biological realities of the brain, we are dealing with secondness. The brain presents itself to us as a complex object to be examined, but our efforts to understand it carry us on into thirdness.

Thirdness represents the mediation of the mind between firstness and secondness (and thirdness itself for that matter). It is reflection that the tasteful hot liquid is tea, and later may be evaluated as an instance of the whole class of black teas exported from India. It is the interpretation of my mental and bodily state of resistance that consciously makes me acknowledge that my guild is inescapable. In other words, thirdness is the result of the articulation, reflection, or consideration of the object (secondness) before us, perhaps also including the raw experience (firstness) of that object. Recognizing that the object we are looking at is, in fact, a car; it is an instance of thirdness, as are all other instances of completed perception, because it makes a distinction between this car an all other objects. All abstract and conceptual thought is thirdness. Peirce thought of thirdness in terms of habits of the mind. It takes some regularity in nature or culture for the mind to perceive something as a sign, standing for something in some respect, and to establish an interpretant accordingly. This was an essential part of his philosophy of pragmatism. Thus, he characterized concepts in terms of the habits implicitly carried by them. Here we stress the idea that thirdness represents the conceptual or perceptual experience of an object or idea as a sign. It is what we make of firstness and secondness, which inflict themselves upon us in their original unmediated aspects without our permission.

Peirce used the term *semiotics* to designate the study of how meaning arises out of firstness, secondness, and thirdness. In his scheme the *representamen* (firstness) refers to the *object* (secondness) itself through the establishment of an *interpretant* (thirdness). Now, an object can be a representamen for someone else; an interpretant the representamen for a third person, and so on. The process of signification ripples, for example, through human society in a sign-web where every sign is connected to other signs, each interpretant becoming a representamen in the next wave. But recalling that Peirce's criterion of meaning is pragmatic, depending on the habits and dispositions

elicited at each step, the meaning of such a sign evolves continuously in the ongoing social dynamics of its own progression, and in the context of the web of other signs. The resulting production of meaning is a thus continuously changing event both on the biological and the cultural level.

This process of signification continues throughout history in the sign-web. So every sign is connected to other signs in a sign-web. An object can be a representamen to somebody else. An interpretant can be the representamen for somebody else. So your interpretation can be a sign of your understanding of a message for others. The meaning of a sign is what it does in the biological, psychological and social systems. Peirce's criterion of meaning is pragmatic. The meaning of a sign is constantly evolved/revised through the ongoing social dynamics of the web of other sign it is connected to, such that the production of meaning is a continually evolving process. In this context the basics for the construction of a second-order knowledge base via units expressed in natural language were shown.

This process is not only working at and with the social communicative level, it is working at all three levels at the same time: the social-communicative, the mental-psychic, and the biological-autopoietic, producing embodied socially meaningful concepts.

Peirce considered any difference or idea that could stand for something for somebody producing a meaning of it to be a *sign* (Brier 1995 and 1996). The *meaning* of a sign is specified in terms of what it does, or the habit that it elicits, whether in a psychological, social, or biological context. This basic pragmatic approach allows us to span all three levels of information outlined above.

In level one for instance, meaning in the Shannon-Weaver context is closely associated with the idea of information itself, and concerned with the reduction of uncertainty. Such reduction amounts to decreasing the number of unexpected outcomes of any situation, ultimately decreasing them to a few or just a single one. This reduction, strictly speaking, is logically equivalent to the notion of a *habit*, i.e., a pattern of activity (cognitive or behavioral) that is specified by the information.

Level two is more complex, but the same idea applies. Meaning is usually carried by linguistic operations that can be understood in terms of syntax. Such operations may be viewed as specifying actions, or more to the point, habits of thought, communication or behavior. The oldest examples of this type are found in the idea of rituals and mimicry, as indicated above, while contemporary instances include formal "languages" such as mathematics, computer programs (Neuhold and Chroust (1985)) (Lucas and Walk (1969) and system design languages (Fowler and Scott (1997)). Concepts are complex instances of this kind, involving linguistic and emotional elements, and sometimes mathematical or logical components as well.

At the third level meaning is understood in terms of consciousness. In Peirce's system meaning at this level is carried by thirdness. To be more specific, concepts point to particular habits of behavior, emotion, and especially of thought.

4. Second order cybernetics and autopoiesis theory

The organization of the exchange of differences that can be encoded as signs can be described through second order cybernetics. Living systems are closed autopoietic systems. They are like black boxes to each other. They do not exchange information in a straightforward way. In specific co-ordinated contexts of life and culture they exchange potential signs. The connections between living systems and between communication systems in society that have been developed for communication are called structural couplings (Maturana and Varela 1980).

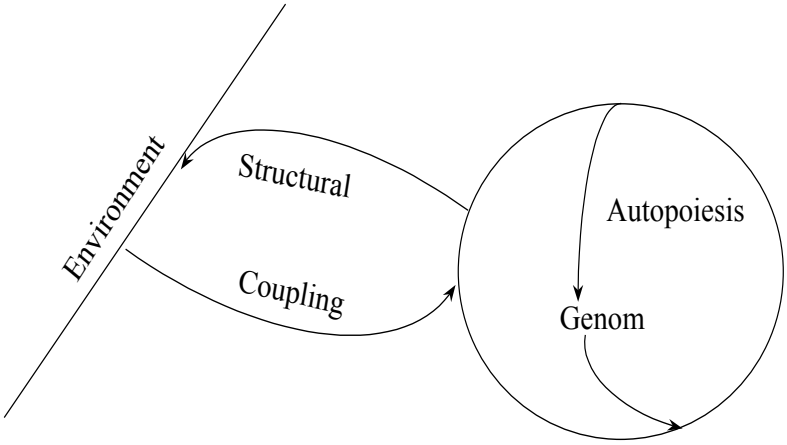

Figure 1: *Graphical model of the living system and its autopoietic interaction through its genome with itself and its creation of a structural coupling with the environment that perturbates it in a repeatable way.*

The couplings in animals, for instance around mating or in society around exchange of money, make it possible for the interacting partners to understand what is exchanged as meaningful signs, and establish interpretants for them within the system. The structural couplings are developed through evolution and the history of society. The systemic sociologist Niklas Luhmann (1995) has generalized the biological concept of autopoiesis of Maturana and Varela into a theory of social communication.

The flow of signs in society can be seen as flowing through various specialized channels such as money, power, science, art, and love. Luhmann calls these "generalized media." Each functions in terms of its own particular code or representation of reality. For instance, traditional religious concepts were a powerful channel for the moulding and transmission of meaning in medieval Europe, while the Age of Enlightenment brought with it a strong shift among the most educated of the populous toward scientific, logical, and reductionistic interpretations of nature and human society. In the contemporary world financial concerns have taken over as the principal dictator of meaning for many sectors of the world, eclipsing earlier value systems.

The above sketching of the connection between second order cybernetic and Peircian semiotics is the core in the development of a new transdisciplinary subject area called *cybersemiotics* by Søren Brier (1992,1995,1996,1999,2000) and developed in the journal *Cybernetics & Human Knowing* (http://www.maurer.demon.co.uk/C&HK/cyber.htm). Figure 2 gives a visual overview of the framework.

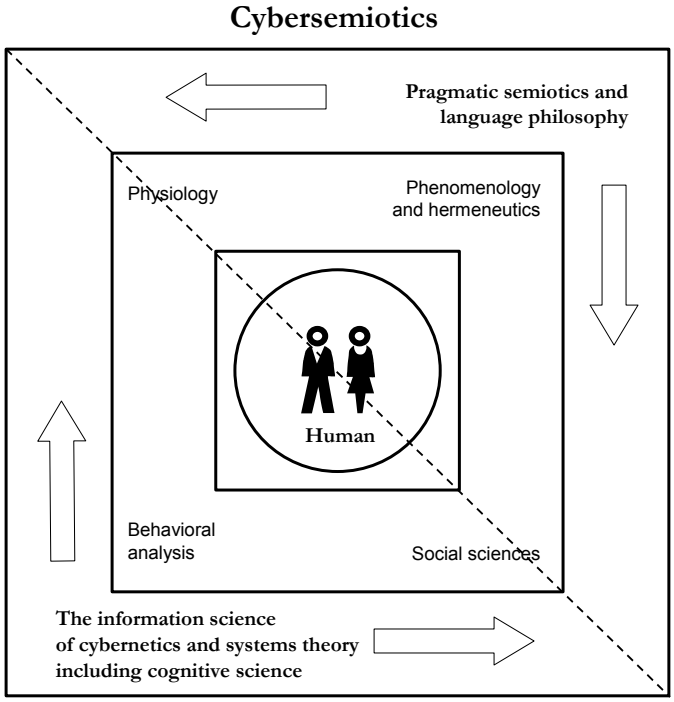

Figure 2*: A view of Cybersemiotics: The model illustrates the way in which two major trans-disciplinary research programs have complementary approaches to the subject of information, cognition, signification and communication. The inner square shows the four qualitatively different approaches to the study of information, cognition and signification in man and animals. They are complementary and are to my opinion not possible to integrate into one science of psychology or cognitive science. Attempting to unite several, but a different selection, of these approaches are two competing trans-disciplinary approaches. One is cybernetics and systems science's information processing paradigm, which have been developed into the linguistic area through cognitive science and Chomsky's linguistics. The other one is the pragmatic semiotics of Peirce connected with pragmatic language philosophy like Wittgenstein's language games theory and linguistics and Lakoff and Johnson's experientalistic cognitive semantics. The first one is a functionalistic approach based on an objective information concept and the other one is a phenomenological approach based on a pragmatics concept of meaning. Cybersemiotics is then an attempt to make a meta-framework uniting phenomenology and functionalism in a pragmatic, evolutionary non-reductionistic triadic view on the self-organization of signs and signification processes for studies in information, cognition, signification and communication.*

5. Consequences for the information economy and society

The attention moved to the immense influence of money-markers in the communication of power in modern society. The increasingly faster development of money marker systems (electronic commerce!) takes power both from the brute-force systems and the other information systems. One of the interesting and at the same dangerous aspects of electronic commerce is the fact, that money markers have a certain physical uniqueness (e.g. coins, bills, checks) whereas information can freely be duplicated without the 'owner' loosing the information. In e-commerce electronic money-markers suddenly take up the duplication property of information and special safeguards have to be established to prevent fraud etc. Further studies of this aspect are needed.

At this point a general discussion of hierarchies was conducted. Several types of hierarchies were offered to the group: the seven layer ISO/OSI model ISO standard 8880 (ISO (1990)) (Chroust2000) of computer communication, a morphological systems inquiry model with 5 levels (from hardware to human activity) and a 7 level model of equilibrium and processes (from atomic structures to social activities). Three unconscious/subconscious and four conscious levels of a personality's natural response to the natural and societal environment were highlighted from the viewpoint of information and knowledge technologies and systems control (14th World Congress of IFAC, 1999). An elaborate theory of hierarchies to unfold the different components and layers of information and communication systems was also discussed[1].

In an attempt to consolidate the findings a map of relations was drawn: Consciousness at the core level is associated with sensations such as the sensation of tea (firstness), which build on the experience of tasting of tea with pleasant feelings and emotions (for consciousness, secondness) that give rise, through images, to reflections, thoughts, concepts, and languages (thirdness) about the nature of the tea – all of this occurring at the level of conscience experience. Such concepts can be expressed through speech or written language codes. These can be communicated via Shannon-Weaver-type channels of communication by appropriate coding and transmission from senders to receivers using any appropriate technology for the channels such as encoded pulses of energy, including feedback to ensure correct transmission. As long as the meaningful social context and praxis the original unencoded concepts related to is remembered as where "the difference that makes a difference" was established, their meaning can be established.

The basis for this core consciousness and intersubject communication is probably established in the early development of hunter/gather society that functioned in migrating bands with social work division that allowed for hunting and raising of children with still growing brains. This biological, sociological and psychological organisation and the feeling of communality and common linguistic communication system seems to be the process creating the self-conscientious social-linguistic human being we know to day. The early stages of language development seem to have been decisive for later development of the brain.

The consequences with respect to the future for development of computer communication and the Internet is that they should be designed as to promote social sharing of meaning, values, and collective consciousness on a global scale in order to heal some of the fragmentation of modern society arising from some of the extreme developments of individuality of modern society.

The trust and corporation spirit making synergetic effort like the SETI-project of sharing PCs for computing analysis of noise from space in searching for extra-terrestrial intelligence was acknowledged, as was the immense intellectual exchange going on in a very helpful manner globally.

Information stress was a further topic. We have too much information, what we want (and need) is knowledge designed for our purposes.

The pro and cons of distance education were elaborated. The wonderful possibility to use universities and experts all over the world and exercising this chance when one has time was

[1] See also the paper "General Hierarchy" by Magdalena Kalaidjieva in this volume

appreciated. But the lack of personal presence and the growing exploitation of family and free time were seen as a growing problem. Distance learning is often used to reduce expenses without realizing the essential function of personal dialogue for human education. It was also observed that students enter distance education with wrong expectations due to underestimating the real effort involved in following such courses. It is essential that the teacher get paid to have enough time to dialogue with the students and that at least two to three full-body meetings are conducted with the teacher for all, or at least among students living fairly near each other.

Although the team did not reach a final 'conclusion' all team members expressed their satisfaction with the conversation. Many of the concepts which belong to the yet not too well understood foundations of information science were looked at from different angles and thus a broader, more diversified understanding was established.

Amongst other factors this was probably due to the remarkable heterogeneity of the team : 6 members from 5 different countries, from 2 continents and from completely different professional fields, ranging from accounting, control theory, systems theory to philosophy and biologically oriented cybernetics and semiotics. Although all members currently came from an academic institutions many of them actually had worked in industry or commerce for a considerable part of their life. Thus in this respect also a good balance was given.

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The axiological foundation of the nature values of information

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1. Introduction

In contradistinction with logistics based upon thinking and mental judgments (deductive, sensual and symbolical judgments), e.g. in mathematics, axiology uses the intellect and a cognitive judgment based on reasoning and knowledge about the value nature of the objectively and time-spatially perceived reality. The lack of popularity of this science is caused by prejudices of scientists (particularly of psychologists), who identify axiology with the notion of axioms, that means a logical judgment in mathematics, being accepted as true without proof in a deductive system.

Already 100 years ago, the American philosopher C.S. Peirce has elaborated (1891) the theoretical foundations of epistemological semiotics, named "triad". However, epistemology, being the science about knowledge, did not meet with great interest from the part of scholars. The research of Peirce was also the basis of the modern science called axiology, published in Great Britain in the years 1914 -1920. Axiology also did not find its right place in the world science and social communication. In the middle of the XIX century scientific investigations were carried on in the domain of the quantitative theory of communication. The currents of that research contributed to numerous theories based upon mathematical foundations of communication and network topologies of telecommunication systems as well as upon the technology of phenomena called feedback. Authors of theoretical achievements were C.S. Shannon and Weaver (1949), and N. Wiener.

2. Inquiry of the systemic nature and the reality

The passage from the era of the virtual world of chaos to the era of the world of a holistic vision of time-space of the nature value of cosmos is conditioned by deep transformations of human intellects and by the progress in communication, information and knowledge. The development of knowledge and reasoning is the basis of an evolutionary integration of societic activity. It is also a challenge issued to human wisdom what concerns respecting ethical laws of the nature being subject to transvaluation. In recognizing the reality, the attention of mankind is concentrated rather upon matter objects and theories, less on processes and nature energy. The so growing up knowledge and consciousness causes, as a result, a poor level of value of human intellects. The contemporary image of the reality is a chaos of numerous and incoherent theories, the domination of logistic, psychological and symbolically presented imaginations shaped by fragmentation, by simplification of abstract structures and by reduction of quantitatively dimensioned environments. The world is perceived structurally, psychologically, sensually and technologically, and is estimated through the activity of

artifacts and techniques, operating instrumentally in the medial communication of the world of virtual reality. The search being carried on for systemic methods in the integration of the heterogeneous nature of global values (cosmos) and local environments, advises of the need for deep transvaluations of our intellects and reasoning methods.

Systems sciences issue challenges to a transdisciplinary integration and activity and to the estimation of information and knowledge in categories of living nature. An axiological interpretation of informatics is a science that, unfortunately, met not with interest from the part of physicians, mathematicians and theoreticians, as well as of sciences applied in the representation of the reality. Research carried on in exact sciences is expressed by a symbolic representation of results that are not easy to be materialized and made reliable from the societic point of view, what leads sometimes to nature degradation.

However, in the contemporary practice this activity is less associated with the nature of value of the living nature, and more with psychological manipulation and of virtual (instrumental and symbolic) reality and technologies of medial communication. Scientific research being undertaken on the basis of such a philosophy as well as the cognitive results are based upon faith and not on knowledge. Hitherto however, scholars of both these science domains did not discover in the nature of reality relationships between information and medecine. They limited their knowledge in that area to the notion of virtuality. Thus, what kind of future can be foreseen what concerns medical assistance where the patient is virtually, but not really perceived?

The effectiveness of integration of natural sciences with informatics is conditioned by a necessity of deep and multidimensional transvaluations of the contemporary knowledge, science and education in both these areas. This is a challenge with a far-reaching importance, and also a key problem of conditioning the development of science and improvement of propaedeutics of contemporary education in both these domains and disciplines of sciences. Bases of research in the domain of medicine, information and communication technologies are the achievements of cybernetic sciences, systems sciences and axiology. These sciences are directed cognitively onto a holistic vision of the world, onto the local and global integration of the value hierarchy, and onto a transdisciplinary categorization of knowledge. Axiology deals with value nature, with methods of local and global integrated reality and with technologies of communication-based exchange of information processes and processes of knowledge gathering.

The process of signification and valuation of information and knowledge is created by the sender and receiver, and through the establishment of an interpretant. An interpretant can be the representamen for somebody else. So one interpretation can be a sign of your understanding of a message for others, e.g. in the biological, intellectual and social-communication systems. Peirce's criterion of meaning is pragmatic. The meaning of an information (sign/message) is constantly evolved/revised through the outgoing social dynamics of the network (web) of another sign it is connected to, such that the production of meaning is a continually evolving process. In such an exchange the intellect is perceived that serves to creating knowledge, through various forms (carriers) of exchange of vocabulary in the reasoning process, expressed in natural language. The processes of exchange of messages run on three communication levels: 1) level of social-communicative information and reasoning; 2) intellectual and knowledge level; 3) biophysical autopoietic level, producing embodied socially meaningful concepts.

3. Nature of information

Information in communication interactions between interlocutors takes various values and forms (carriers). However, the occurring changes of these forms (technological wrappings) in the transfer of information and messages cannot interfere with the nature of information value. In communication and exchange of messages on the level of semiotic processing of information the following values and forms of information can be distinguished:

- genetic, e.g. of the social generator and sender of information;
- biochemical, e.g. of the process of information value processing and representation, the process being generated in organisms of living nature;
- biophysical, signal being transmitted in various, heteromorphic environments of the reality.

The flow of information in the society can be seen as information processing, expressed by channels and interfaces - media of various nature. These are, for instance, books, journals, radio, TV, computers, money, arts etc. Each of them is functioning on the basis of its own reduced code and syntax and represent the reality. An example of the role of information in the flows of messages and knowledge can be the communication packages - wrappings (carriers - markers) of human intellect and activity in internet communication; capital turnover, economic changes , book market, health protection, etc.

J.R. Simms determines information as a specific nature of intellect energy that is of an organic and morphological character. That cause information to have an ephemeral (fugitive) character what is connected with the necessity of its continuous generation. Thus, information is born in the genes which are the source of information. Processing of that information is performed in morphological organisms of the living nature, and the neuronal carrier of information in the time-space of reality are biophysical processes that are running bidirectionally in the nature.

The source of activity of the living nature is the information connected with 1) the replication of genetic information - the algorithm of information and recognition processes (e.g. RNA - ribonucleic acid); 2) the biochemical information processing and use - algorithm of metabolism (e.g. hormones of insulin and generation of additional insulin for supporting life); 3) the realization of distributed information actions and algorithms with neuronal and organic features (e.g. sensual activity, muscle contraction). Generating various kinds of potential by the organism, e.g. force, power, causes manipulating consecutive tissue contractions, or counteracting by the information sender and receiver. In such a way the algorithm of the process and the forms and values of information arise.

Thus, it can be assumed that the whole of transformations connected with processes of information and interhuman communication is submitted to laws of metabolism occurring in the nature of values. These are transformations with biochemical, biophysical and energetic character, that take place in living organisms, e.g. periodical or cyclic changes of shapes in the organism cells. In such a way the changing conditions of coexistence of the human being with the nature issue a challenge to new values of matter and technologies based upon the quantum theory. They penetrate, indeed, profoundly into the nature of physical quantities of nature, can change these quantities, e.g. energy. They can also describe the physical states and changes with the participation of microparticles and

perform their integration. Quantum technologies are, in their physical nature, closer to processes of network integration of information and knowledge flows. Transformations taking place in information processes are running in environments in a horizontal and vertical way. Their organic consistence in the integration of nature of processes is subject to mechanisms of phenomena called feedback and to transformation of flows in information networks and processes.

Information processes and the value hierarchies of environment nature presented in Table 1 occur in a horizontal and a vertical way on three levels of transformation, top-down and bottom-up (bidirectionally). The validation of information and knowledge processes is subject to laws of nature of environment value. These laws are manifested by the activity of communicating interlocutors in the three semiological dimensions. The component that assures the value of information, knowledge and activity (energy) are feedbacks, that occur vertically and horizontally for the flows of genetic, biochemical and neuronal information in the entire hierarchy of the environment.

4. Hierarchies of systems value nature

The vision of the transforming reality and the categorization of its systemic hierarchies are manifested by images of a dynamic, time-spatially integrated nature. The reality is comprehended by the evolutionary and transdisciplinary activity of environments being categorized by the integration of local and global values of nature of the societic system (see Table 1).

1. The value nature, being dimensioned by *bio-physical platform matter, is quantitatively* categorized as neural information: by the potential of the mass of physical matter and statics of structures of the universe, by the complexity of material constructs of the environment, by the logistics of symbolical representation of objects and relations of systems and arrangements being modeled, e.g. artifacts, automates, machines. A basis for the evaluation of structural values of matter are methods and theories of demonstration of truths (probabilities), of formal correctness and optimization of solutions of physical constructs. The basis of the two-value categorization of truth and theory of physical complexity of system structure are techniques and logic of fragmentation and reduction of nature complexity. In shaping the environmental structures of objects and organizations methods of simplification in structural modeling of artifacts (neural networks) are applied, based upon a symbolic and two-valued representation of mapped objects and systems.

2. The nature of value being dimensioned by *the morphology of biological organisms* of the living nature is categorized ***qualitatively*** by the power potential in the energo-dynamics of transformation processes and transfer functions (communication operations) of environment behavior-as biochemical information. The base of this value dimension are processes of nature transformation, the dynamics of their functions and conditions in maintaining a dynamic equilibrium of the environment, and a symbiosis with the environment in the course of evolutionary and biophysical transformations of the world of living nature. Object of evaluation of that dimension are: quality and efficiency of morphological values of nature and of the behavior functions in collaboration of system environment in the organic-intellectual integration of activity of human entities. Organic and energo-physical processes in the morphological environment actuate information (transfer) flows and activate human intellects and consciousness, inspire reasoning processes which - by generating processing -activate the mind operating on resources of human knowledge and transform the values of intelligence and personality of the human being. Thus, conditions emerge that enrich the perception and association activity with regard to physical and intellectual values embedded in the third

and first dimension of the nature of environment value. They can also be shaped by means of perception with regard to the first dimension being categorized sensually and symbolically. An example of quantities of that dimension are analogies of changing potentials of capital and values of knowledge about money flows and information flows. The monetary flow system is parallelly integrated with the information system. In processes of activity of these systems mechanisms of flow (turnover) of financial money and capital, and flows of information and resources of knowledge about the system environment are parallelly embedded. That is the dimension of physical forms of capital value, the carrier of which is money and information concerning matter values (dimension 1). Another example can be the dimension of quality of the potential of energy and activity of the environment expressed by the dynamics of information processes and the capital turnover concerning values of energy resources (dimension 2). A further example of that dimension of value is the creative activity of societic and economic environments integrated by communication and information flows of knowledge value, by increase of awareness and social ethics (dimension 3). These examples show metaphoric analogies between processes of capital creation and its financial turnover, and processes of development of the information system and resources of knowledge representation : e.g. money (information), capital turnover (communication, banks and stock-exchanges) and capital potential (knowledge resources). When illustrating these comparisons between an information system and a financial system one can state that the kernel of activity of monetary flows (of capital and financial turnover) is the - being embedded in the information system and permanently updated - information concerning the conditions of a dynamic equilibrium of the capital turnover market. A universal measure of value is the gross domestic or individual product. The information system supports decision making connected with dynamics of the turnover and allocation of capital potential, for instance in the market economy, matter-energy resources in commodity turnover (media, consumption, transport, intellectual goods and art, etc.) of an arbitrary information management system.

3. The nature of values being dimensioned by the intellect and awareness of the human being (micro) is categorized by communication-information flows and by ***sociological*** transformations of environments (micro- and macro-entities) is categorised as genetic information processes. The basis of that dimension are two levels of nature values: the Psychological and the Societic intellectual one:

A. The psychological dimension is categorized theoretically by the abstraction of situation images of the environment, by the potential of human mentality of the sensually spiritualized and emotional thinking, and by binary logic. The world is perceived ***virtually***, instrumentally (by medial communication) and technologically in the time-space of chaos categorized by logistics theories and abstraction of the spiritualized vision of the world. The nature of environment values is a symbolism of images and structures of physical matter, being not easy to be transformed and materialized with taking into account values of the living nature, thus also of the human being. Thus numerous manifestations of degradation of environments and conditions of human existence arise. The knowledge representation of this dimension is the development of applied sciences: medical, agrarian, logistic sciences, mathematics, law sciences, art, handicraft, technique, theatrical and musical creative production. The environment activity is categorized by binary logic; by communication and medial vision of materially (capital based) perceived reality; by operative thinking; by control logistics; by modeling; by inferring formal correctness of mappings; by optimization (also named philosophy of the poor), etc.

The ***chaos paradigm*** is directed by symbolism of statistical quantities, e.g. by the mathematically and ontologically operated and disordered chaos. In categories of chaos, the paradigm of nature image is the highest religious good - God and the faith. Environment visions are dominated by operative thinking, by processes of symbolic and profoundly abstract categorization of the reality. On the one hand, we are governed by ethics, faith, sentiment, imagination; on the other hand we are helpless to deal with perceiving the complex reality we cannot cover by our knowledge and consciousness. Thus, in communication we use: fragmentation, reduction, manipulation, symbolism of meanings and values, and abstraction of opinions. Generally, when we are not capable to cover by our knowledge and consciousness the perceived reality, we do avoid these difficulties and we facilitate our evaluation by so-called symbolical transitions and by manipulation of the abstract vision of the world. An important role in such behavior is played by ethical intentions and by the sense of moral responsibility. However, as knowledge and consciousness of the human being (human entities) increase, the force of motivation of that dimension is reduced. That dimension is characterized by communication and relatively poor values of information and knowledge about the reality, but by a high potential of sensual and emotional force of will and energy to motivation and to symbolical and abstract imaginations. The result of such an activity are numerous facts showing that the human being, when intervening by symbolism of his/her artifacts in the matter, is not aware of the destructive consequences caused in the living nature by the influence of physical artifacts materialized in a faulty way by the man. It is in that way that the ”environment protection” science was born. Values of the spiritual and sentimental chaos are expressed by culture of faith which is transferred onto creativity and art expressed by various forms of the perceived reality, particularly ethical laws being derived from religion and symbolical communication of the human being with the reality.

B. The nature of values being dimensioned by the **societic-intellectual awareness** of the human being (micro- and macro-entities) is categorized by processes of ***reasoning*** and by ***knowledge*** potential, by intelligence level, wisdom force, good sense, creativity in motivation of social activity, and also in categorization of ethical and societic values of environment development. Knowledge flows and information processes are connected with nature transformation on all levels of hierarchy of its values: material world, biological world, animal world and human world. Processes and flows of knowledge are running cyclically and with loops, from above toward down and inversely. The evaluation of these processes is the basis for a categorization of knowledge and human communication activity. Each dimension of the value nature has its proper information systems, potentials of knowledge resources that integrate flows of human activity and societic communication. The reality, being systemically categorized, is decisive what concerns evolutionary values of system architecture and communication that integrates the internal and external transformations of environment activity. The energetic potential of dynamics of that dimension are: the activity of logical thinking, management of processes of gathering, processing and representing knowledge, and capacity of categorizing and validating “products” value of human intellect, e.g. decisions, evaluation and potential of knowledge, awareness in thinking, and activity of behavior. In the morphological sense, the potential and the activity of human intellects appear to be a specific “organically operating mechanism”, that processes information and knowledge and performs reasoning processes. They coordinate the behavior of human personality, of ethics of its activity in the environment. In the axiological dimension, the nature of information and knowledge is distinguished by the evolution of genetic and biochemical information arising in the process of synthesis of protoplasm of living matter. The synthesis of that matter and its behavior are a specific generator of genetic and biochemical information. Biochemical information arises, is measured and is observed by means of processes of chemical-energetic transformation of a living system. It is the basis of metabolism and knowledge for criteria of life. And neuronal information is a form of action of potentials operating on genetic structures of

information with great diversity, and appears in the animal world. The operative activity of mentality of a man deprived of information and knowledge supply becomes a symbolic thinking activity. Thinking is not identical with reasoning that transfers the human personality to an activity in the dimension of psychological, emotional, spiritual, sensual and abstract values. On the other hand, thinking processes are coordinated operatively and controlled by the energy of logic of the human intellect, the energo-morphological nature of which influences personality, reasoning ability, apprehensiveness of perceptive reality recognition, and communication-information interaction of the man with the environment. Intellect and knowledge enrich the perceptive values of imagination, capacity of association and adaptability, ethics and culture in cooperating and dealing with the reality, organization of systemic activity of the environment.

The paradigm of ***cosmos*** and of the universe is a system of multilevel layers and hierarchies of values. It is categorized by the time-space of the planetary system and solar system, the biophysical matter of which are: the earth globe, the satellite systems of the cosmos and of the dynamic earth stratosphere, etc. In this image, various forms of vision of the earth globe appear, and entities of living nature being capable to displace themselves in a time-space, horizontal and vertical way with regard to the earth level. Thus, it is the dimension of behavior of the evolutionary symbiosis and information-intellectual communication taking place between the human being and the multilevel hierarchy of the number and value of layers of the earth globe.

5. Conclusions

Bases of knowledge and education in the domain of informatics and communication are the measures of multilevel hierarchies of values resulting from an exchange of information and knowledge of the locally and globally perceived reality. The capacity of human intellects to generate information serves to create knowledge and perception of the human being with the environment for understanding the nature of reality. ***Information is the process and energy of the intellect*** , that energy influencing the conditions of creative sentences and relationships between information and knowledge. Thus, possibilities arise of a quantitative and qualitative evaluation of knowledge by categories of the information being generated and of behavior of human personalities, creating information and transitions from quantity into quality. Such possibilities are not caused by neuronal information elements which are observed and measured by work mechanisms. They appear in the tissues of animal organisms and are the result of structural changes of forms of operating potentials and structures of information being generated with a great diversity. Senses (quaila) are the energo-psychological thinking and activity of the human mind, but information is the energy of intellect and reasoning serving the creation of knowledge and human personality.

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Virtuality and Transparency

Gerhard Chroust, Austria

Abstract

Starting from a two-dimensional scheme analysing the relations of objects (being/not being versus manifesting/not manifesting) we transfer these ideas from the epistemological domain to the domain of software engineering. In software engineering the concept of virtual and/or transparent objects and their hierarchies is instrumental to the building of complex systems. We explain these concepts from the viewpoint of a software engineer showing that there is a two-dimensional scheme of virtual/real versus visible/transparent which can be related to the concepts by Soeren Brier. We also establish an analogy to the Johari-window. We argue that with respect to the four fields spanned by these two-dimensional schemes the Yohari-window and software development show an opposite behaviour with respect to the shifting of the boundaries over time.

1. Background

The discussion of the team on "Design of Disciplined Inquiry on the Foundations of Information Sciences (FIS)" at the Fuschl Conversation 2000 [Chroust-00k] was based upon a manuscript by Soeren Brier [Brier-00], later also published as [Brier-00b]. In an attempt "to model the relations among different kinds of organized knowledge systems" Soeren Brier identifies at the lowest level of analysis two dimensions [Brier-00, p. 95]. For the first dimension he states: "The basic, metaphysic decisions … is to decide what exists and what doesn't." He identifies this dimension as the being/not being dimension. As second dimension he introduces what "can be accessed through normal senses: manifesting (explicate order), and what cannot: non-manifesting (or implicate order)." These two dimensions span 4 "basic ontological realms of the world": object, hidden, fictional, nothing (see Fig. 1).

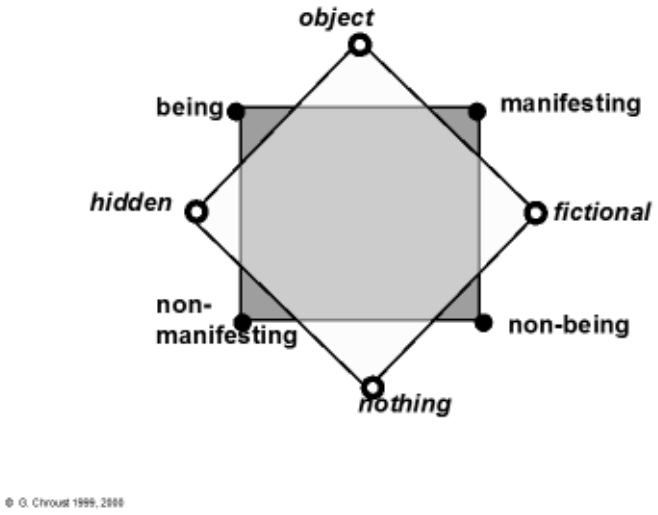

Fig. 1: Basic ontological realms of the world

2. Abstraction, Virtuality, and User Interfaces in software systems

Abstraction is one of the keys to the success of software. It manifests itself in three important uses:

- Creation of virtual machine architectures
- Achieving uniformity of hardware
- Hierarchical levels of abstraction

2.1. Creation of virtual machine architectures

In the 60'ies different hardware computers had been build which all had to be programmed in a different way, with different instructions etc. This made changing to another (typically bigger and faster) machine almost impossible. In this situation IBM [Amdahl-64] defined a so-called 'machine architecture', a virtual interface to a virtual machine which was to be the standard for future programming, cf. Fig. 2. The machine architecture was to be implemented by some software-like code, which was called microprogramming [Husson-70, Chroust-80m, Chroust-89a]. This was called 'emulation' of machine architectures.

To the users, e.g. the programmers, the machine architecture was the only visible interface, everything beneath it was transparent and of no importance. As a matter of fact, the concept even allowed the machine architecture to be implemented directly in hardware, thus blurring the distinction between real and virtual.

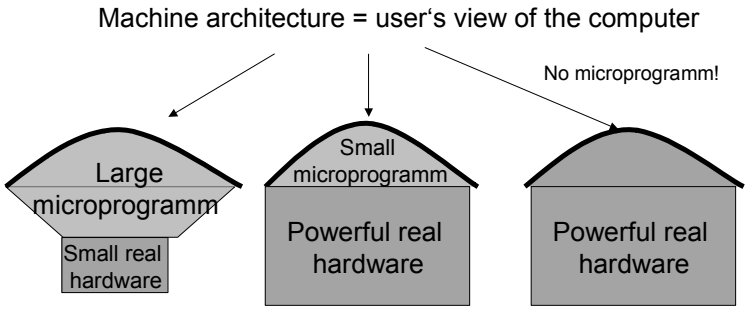

Fig. 2: Virtual Architecture and Microprogramming

2.2. Achieving of Uniform Hardware Structure

For the diverse applications of computers it soon turned out that – despite the usefulness of a uniform machine architecture – different architectures were needed for different application fields (e.g. control of industrial complexes, real-time processing, …). Again the concept of microprogramming came handy: One was able to use one uniform hardware (i.e. the same

information processing circuitry and storage) which could be produced in larger quantities and could 'personalize' it via microprogramming to have the 'appearance' of different machine architectures [Husson-70, Chroust-80m, Chroust-89a].

2.3. Hierarchical Levels of Abstraction

The rather primitive level of actual computer hardware (the actual electronic devices like transistors, wires, etc.) and also of the machine architectures mentioned above provides only basic programmability. The users, however, desire to communicate with the computer in a high-level, problem-oriented, ergonomic way. The conceptual and cognitional difference between these two levels has to be bridged. The history of computer science largely shows the continuing reduction of the gap between the user's problem oriented view and the hardware view. A feasible way to bridge the gap and to enable interactions meaningful and acceptable to humans is to interpose several level of abstractions between the actual hardware and the user interface. These levels are often called abstract architectures or are even considered to be abstract machines.

Fig. 3 shows one specific 7-layer model for the communication within computer networks: the ISO-OSI standard 8880. In the course of communication of two nodes of a computer network, each node communicates in a virtual way with the same layer of the partner node. Each layer defines a protocol for communication and the higher in the hierarchy, the more user-oriented and problem-oriented the communication becomes, freeing the user or the programs at the two nodes from many clerical tasks. Every layer uses the services of its immediately underlying layer until the physical level is reached where the actual ('real') communication takes place based on electronic communication [ISO8880-1-90].

The highest level, the Application Layer, presents to the user an interface for running the applications with very little concern for the actual handling of the communication.

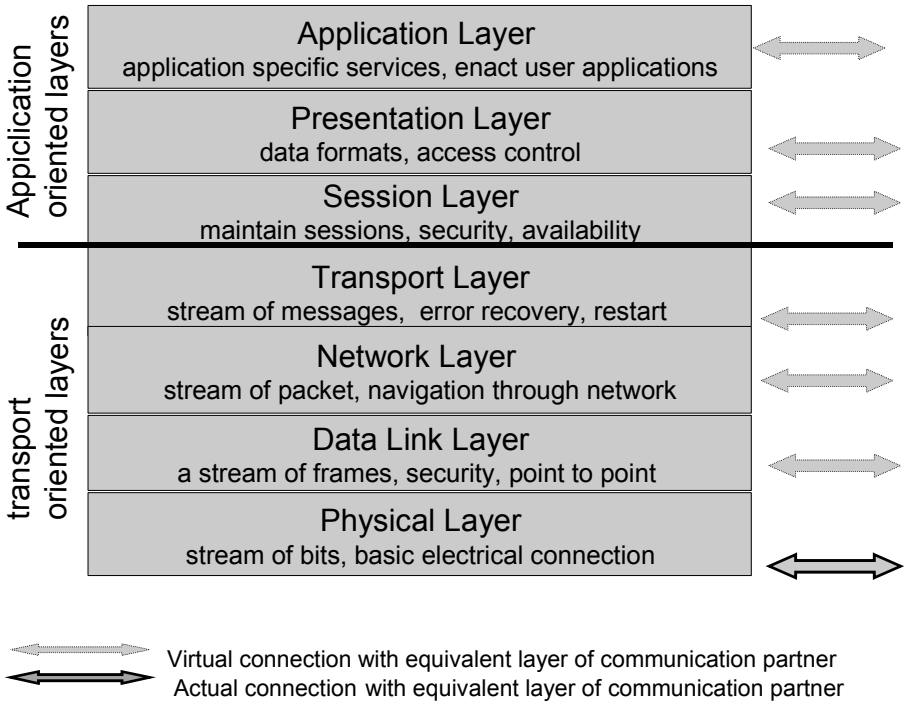

Fig. 3: The ISO-OSI Model (Open System Interface)

3. Visibility and Transparency

The question of visibility, resp. of transparency is different in software systems and in other technical systems (e.g. electromechanical systems). All these systems are built with the concept of layers of virtual machines.

A typical example are the controls of a car (brake, clutch, steering wheel, …) where the user has a simple model of their functioning (direct interaction with the respective effector like wheel or motor) but in reality there are numerous components interposed, like the automatic shift gear system between the user interface (the handle) and the actual effector (the motor). One very vaguely knows (perhaps from driving school) about these intermediate components, there existence, however, does not affect the user model and is largely irrelevant for the operation of the car (as long as the system works properly).

These intermediate transformation devices are largely transparent to the user but very manifest to the knowledgeable (e.g. the mechanics). But even a simple minded user can detect their existence by looking a little more carefully under the hood (probably without understanding their workings). In contrast the transparent computer objects, however, are themselves implemented on top of abstract (i.e. virtual machines), their functionality is volatile and very often cannot be observed at all.

In computer systems both the transparency and the virtuality can be driven to a point where a user is practically unable to make the distinction.

An electromechanical systems will usually not be able to present to a user a convincing non-existing object while computer systems can present Virtual Reality of a quality which makes the presented objects indistinguishable from real objects.

4. Virtualisation, Transparency and the Software Crisis

Already in 1986 F. Brooks [Brooks-86] expressed concerns with respect to the difficulties of software development (commonly called the "software crisis" [Naur-69]). He stated four reasons for this state of affair of software:

Complexity – no other technological product is as complex as software. The argument takes into account the combinatorial multiplicity of digital systems together with their discreteness as compared with analogous properties of most other mechanical systems which are only able to provide some crude analogy to digital conversion.

Conformity – this is in itself not a technical argument but it takes into account the desire to make software to conform to many different environments, platforms, usages, …etc. It again adds complexity and error-proness to the product.

Invisibility – as indicated above, transparent components are in many instances easily detected in electromechanical systems even if their actual function is not understood. Software itself is invisible - so how to detect or locate the transparent components?

Changeability – again this is a non-engineering argument, but the ease of change induces fast, ad-hoc fixes and modifications without proper considerations of all ramifications etc.

We can observe that in software engineering both virtuality and transparency are partial answers to the problems of software development:

- The *changeability* of software (with all resulting consequences) induces us to modularise software and to *hide* certain decisions from the outside world ('Information Hiding' [Parnas-76, Balzert-96, Rechenberg-97]), leading to transparent objects.
- *Invisibility* makes it necessary to represent the domain of discourse for the customer with the help of virtual objects.
- The desire for *conformity* forces the software engineers to contain the existing differences in certain ('virtual') modules and to hide alternatives from alternate groups of users (forcing 'transparency').
- The user can be shielded from *complexity* by levels of abstract machines (as provided by virtuality and transparency). The designers, too, are helped in their quest for mastering complexity by the introduction of intermediate levels and abstract machines.

A close analysis, however, also shows that both transparency and virtuality are also reasons for the causes of the software crisis:

- The number of abstract machines gives raise to considerable added complexity which is detrimental to software quality.
- Transparent objects relate directly to the invisibility property of software and make it difficult to verify and validate systems.
- Complex software is needed to provide an acceptable level of virtuality (and the demand is growing fast).

5. Shifting Boundaries

The Johari-Window (Fig. 4) shows the situation in the realm of group dynamics [Luft-63]. It identifies four fields. In the light of our discussion we can map the known/not known-to-the-Self to the dimension of being manifesting/not manifesting. In view of the discussion of the previous discussion on software systems the 'known/not known-to-others' could be related to being/not-being. The argument about machine architecture indicates that to the user the distinction between being/not-being very often cannot be made at all by himself, but by some outside experts ('others').

Group dynamics teaches us that with the maturing of a group the boundaries shift. They shift in favour of more self-reflection and in favour of reducing secretiveness, i.e. more becomes known to oneself and less is hidden from others.

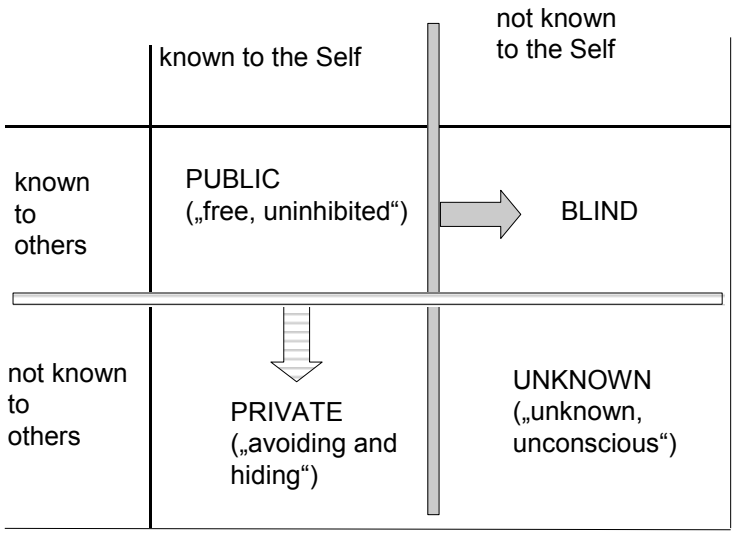

Fig. 4 Johari-Window

Fig. 5 shows the software's equivalent to the Johari-Window: what does the user see and what is transparent to him/her? The discussion in the previous chapter, however, argues that in software the trend in shifting the boundaries is different: There exists a tendency to reduce the number of different existing ('real') objects by replacing them by virtual objects performing the desired functionality. This usually is accompanied by a generalization of the remaining existing objects in order to provide genericity and customisation (e.g. microprogramming and personalization [Riecken-00][Riecken-00b]).

At the same time one tries to hide as many objects as possible (making them transparent). The user interface is reduced to fewer and fewer intermediate components to access and manipulate the peripheral components according to the user's wishes.

Thus despite the fact that there is this basic similarity, the trend to shift the boundaries (cf. Fig. 5) is going *into the opposite direction!*

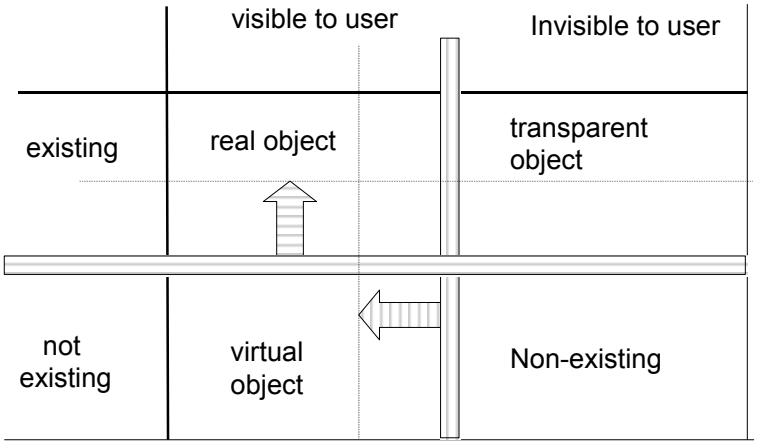

Fig. 5: Virtuality and Transparency in software systems

6. Observations

Above considerations give raise to some interesting observations:

- First of all software engineering depends on hierarchical levels of abstractions, resulting in virtual objects, which can be presented in a way which often makes them indistinguishable from real objects.
- The property of being virtual does not so much depend on epistemological ‘knowing’ or ‘not-knowing’ but rather on practical considerations of ‘not-ignoring’ or ‘ignoring’ their existence. This is supported by the refinement of technology to an extent that the distinction between real and virtual objects is blurring. Computers can provide user with the complete illusion of even moving around in a world with all attributes of reality. Current technology usually still requires digital helmets and gloves, but very soon (cf. so-called caves, virtual environments etc. [Braham-97]) they will become unnecessary.
- In order to bring more and more people into interaction with the computer systems one must bring the appearance of the interface nearer to level of understanding, and problem solving support the actual users need, again by providing user-oriented virtual objects. The complexity and the technical challenge of the underlying computer systems forces system providers to hide most of the complicated system functions from the user by making them transparent.
- Thus in software technology technology the reasons for using “hidden” and “fictional” objects (cf. Fig. 1) is different from other domains. In the domain of software we therefore prefer the terms “transparent” and “virtual” to the terms “hidden” and “fictional”. The use of the term “virtual” might be construed to imply a certain vague knowledge of existence. Similarly the term “transparent” does not imply negative connotations of “hidden”.
- It also seems that in software the “level of transparency” plays an important role. It could range from not knowing to a basic knowledge about the existence without having any interest in it. The property of being hidden or fictional thus becomes more an issue of engineering considerations and less an epistemological question.
- The very notion of ‘existence’ is actually difficult to establish in the realm of virtual architectures and the underlying hardware: If an architecture is defined by a given code pattern in a general hardware storage (plus supporting hardware functions), is it real or virtual?

7. Summary

Starting from a discussion of basic metaphysical dimensions at the Fuschl 2000 Conversation we took these considerations into the field of Information Technology. We discussed these term in view of modern computer systems and showed some analogy. We also pointed out considerable semantic and pragmatic differences. Considering an analogy to the Johari-Window we have shown that the dynamics has an opposite trend with respect to the shift of boundaries over time. While group dynamics essentially aims at reducing the fields which correspond to virtuality and transparency, in information technology the opposite trend can be seen and also supported by very economic and ergonomic reasons.

The consequence is that computer systems provide us with a largely virtual world, consisting of layers of virtual architectures/machines. The reality of objects might be of no interest to the users.

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A Pattern for Software Enhancement for Researcher

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Abstract

Traditions in science and long range observation led to the design of methodologically sustainable units of scientific knowledge, intellectual routines, interaction patterns in researcher teams, patterns of presentation and being presented, of acceptance and recognition, patterns of knowledge transfer and reception. Personal computers have recently reached the memory size and the performance speed to become a valuable partner of researchers and managers, but software industry is not aware of the fact. Software industry has the ability to create, adapt and commercially wrap programmes, but not the specific knowledge how to design them up to the requirements of methodology of science. A new type of collaboration may minimise investments – the earlier started the better - and may enhance quality of sofware products for clients from science and management, teach and train cretivity.

Index terms

cybernetics, intelligent systems, philosophical considerations, science, technological innovation, technology forecasting, user interfaces, writing

1. Introduction

Research activities use methodological elements from management activities and vice versa. Beside the usual working out research results and verifying them, there is a considerable amount of information resources, knowledge sources and archiving, and own research output (publications, manuscripts, etc.) management. Particular principles and algorithms, information and knowledge units, patterns of composition during research creativity are objects and rules for these management activities and their security, additionally to the usual team creativity or institutional management at research sites [1-5].

2. Previous Research Used as Background

They have been testified and described in a series of previous publications listed in the references of the paper. As software designers and producers are not supposed to be familiar with methodology of science, here is made an attempt to translate methodological algorithms and methodologically important information units into their concepts. However, a considerable amount of work hides behind such translations, their variety and priorities have been evaluated for many years. A hard piece of work both for interdisciplinary transfer and collaboration as well as pure disciplinary for the foundation of information science stays ahead.

First attempts to evaluate the minimal requirements of methodology of science to computers were made 1973 with an IBM 340 [6-8]. A second more successful attempt followed 1975 with a CDC 6000 [9-13]. A third attempt and the first prototypes were presented 1984 and licensed 1986 [14-19]. Their testing, evaluation and investigating the fundamental problems both in methodology of science and information sciences and adjacent fields of knowledge stated that computers had not reached the necessary capacities, but theory had to be further developed in the meantime, in order to have a good timing for implementation [20-28].

The version for Windows 3.1 was presented 1995, 1996, 1998 [1-5]. During this period many single requirements were hinted to software industry on the level of personal contacts (as there was no law for intellectual property for sofrware patterns in Bulgaria at that time, it was voted by the Parliament only in mid 1999). The volume of memory needed for the simplest methodological algorithms is considerable. And the good news is that modern PC capacities already have come up to the practical requirements of methodology of science[1].

3. Methodology of Science Needs Help from Programmers

It was a long lasting dispute, whether a researcher's archive has to be supported by a specific programmed tool or it is satisfactory to enhance existing ones for the specific purpose. In this paper is described the second alternative. It is chosen for visualising the requirements of science methodology and scientists. The decision on the efficiency of the alternatives and the ways to create the tool for the second alternative, if appropriate, is handed over for colaboration with the software designer and producer.

Concept: Methodological algorithm may be an illustrative step, phase of processes and execution modes used in creative research work as methodologically important sequence of information processing steps. *Methodological information unit* is a methodologically important knowledge unit as they are described in other papers [1-5].

3.1. Creative and Archive Mode

Researchers often use their personal computer (PC) as a typewriter. At least they think so and have for now spare tools to do better. An intelligent typewriter, calculator, picture designer and memoriser in one, having the capabilities of modern PCs is able to do far more intellectual services, i.e. information archiving, processing, retrieval, suggestive, associative, etc. work. These kinds of work are some well known out of a multitude of specialised methods for creative design activities in all spheres of life. Some basic requirements will be illustrated for the case of writing a paper for a symposium, conference, a report manuscript for the administration of a research site or for submission to a research project, a chapter of a book, a consulting manuscript, etc.

In this mode a researcher is typing mechanically on the keyboard. Any effort distracting her/his attention towards technological questions on the part of a computer programme is highly boring. Even the spell check is tolerated only after the first draft text body is complete and has been thought over and slept over for several nights, i.e. at the end of the creative design mode phase of the researchers peculiar labour process. She/he has very different problems to care for. During the creative and archive mode a researcher composes previously assimilated knowledge scattered

[1] A description of the content and links among the referred titles, procedures and difficulties met during research may be introduced later or in the final paper.

throughout the PC in information text and image pieces in an unbelievably random way. Actually, it is the chronological way, disrupted by the default services of programmed packages. Some programmed packages do not organise a separate directory for user files under DOS.

Main objects to pay attention of are the information and knowledge units of Researcher's Archive and the optimal way to compose them together for the target audience, where they are going to be presented. In the course of years their number and volume becomes considerable and retrieving exact information takes too long. For a paper of high quality preciseness of citations, references, definitions, comparisons is unavoidable. To find a piece of information, e.g. a definition of a concept, in manuscripts written in the course of 20 – 25 years, moreover, to order in a sequence its 7 - 10 refinements during the same and possibly 5 more years, may have lasted for weeks in a hard copy researcher's archive; in a computer maintained Researcher's Archive using PE and PE2 text processing for IBM XT – a few hours up to a day; in a retrieval supported PC Researcher's Archive using the recent Windows version and a good processor – an hour or less. With the pre-designed enhancements – a few minutes.

3.2. Programmes Interaction Mode

In this mode a researcher is exploring abilities of programmes, testing their limits, measuring intellectual support he may get. He chooses options, tests their convenience. Simultaneously he imagines and tests possibilities for experimenting and refining research results. He tests also options for organising his own scientific output. He summarises requirements for designing new programmes or even enhances his programming abilities and creates new programmed modules for the specific investigatory purposes. For all modes of using a PC, but especially for this one it is essential tp have a separate Research Archive domain, Programme Enhancements domains (probably with each package separate), Commercial Programme domains, which are no subject of interest to the individual researcher.

On the one hand, it is essential for a researcher to install the most modern version of calculating, image processing, etc. programmes for peculiar analysis, synthesis, design and verification of new generated knowledge. On the other hand, learning about how to reinstall the researcher friendly methodological adaptions destroyed while installing the current (Windows) version is too boring, or finding/paying for someone to do this - too expensive to repeat every 6 months. Moreover, skills to apply methodological adaptions have to be destroyed, altered and trained for each new version, which may last up to 3 months to achieve the previous ease and speed. This means that the methodological algorithms and units have to stay stable throughout many versions to come. Researcher-friendly services have to be 'inherited' by later versions in such a way, that the user is not forced to pay attention to changes, but gets the opportunity to explore new programming tools and intellectual services during the investigation play mode.

3.3. Investigation Play Mode

Investigation hazard of researchers is remarkable, even notorious. It is the talent needed for the profession. But it is destructive for the object of interest under some circumstances. So does it for computer programmes. Testing options, designing algorithms of interaction, trying 'what would be, if…' is a play, a relaxing after hard work, sharpening the senses for imagination and fantacy. It seems and it might well infantile, but belongs to creativity.

Enhancements of commercial programmes seldom are efficient and the play ends by reinstalling the programme package and resetting all the methodological adaptions. Psychologically and

emotionally the researcher is satisfied, or his curiosity. And he is fond of having made important experiences. The play may have taught him unfamiliar intellectual routines, puzzle stones for a new picture.

It is a puzzle play, but without the sheet of the whole picture. Difficult, but challenging - wouldn't his character be so, couldn't he choose this profession. The Investigation Play Mode mode is pregnant with novelty and sometimes a novel idea leads to important knowledge and innovations. It is the beginning of a long road, actually each time one of the beginnings of a multitude of roads.

3.4. Computer games for relaxation

The Investigation Play Mode has nothing to do with computer games for relaxation. They are passively consumed, while the creative functions are 'switched off' and the brain is regenerating for the next period of concentration. Usually, researchers have no high respect for commercial computer games.

4. Recent Enhancements with Researcher Friendly Design

'My Documents' entry and automatically open a file into the proper programme

Here is a proper place for the Researcher's Archive [16, 18-26]. Opportunities to choose or install default user directories in a random domain are increasingly offered in packages. Automatically open a file into the programme, it was created in. But this utility still does not function stable and does not make suggestions in which out of both the available and to install later programmes the file should be opened. Now it opens only the long list of programms installed in the PC, the user is humiliated by the fact not to be a brilliant programming genius and shuts down. And if he has randomly chosen the false one, The file is lost even for the proper one, because there is no 'Undo' option.

'Find' utility from the 'Start' button.

In some programmes it is applied also for inexact files and folder names, guessing and suggesting independently of where the searched item is placed. For the Creative and Archive Mode it is sufficient to look up in the user files area. This area has to be regarded as a User Area/Domain from the viewpoint of the user irrespectively of where the files are located. Earlier versions of the Researcher's Archive had the obligatory requirement for all these files to be subordinated under one directory in a definite structure of subdirectories. Modern versions may discuss the conveniences for programme designer and user and to suggest solutions for the convenience of all.

Drag&drop copy&cut&paste routines, 'Change Case' button and 'Undo'

It is fact that scientists use whole expressions or single words defined for the current manuscript only. These can be refined later, defined as concepts or abandoned in days, weeks, years or decades, i.e. throughout a researcher's life and career. This is a reason to be highly satisfied by the drag&drop copy&cut&paste routines. The 'Change Case' button on the toolbar saves rolling out menus and clicking boxes: Drag&drop copy&cut&paste routines often move/copy from and into titles and subtitles. 'Undo' utility with a sufficient long list backwards.

All these are positive examples for recent enhancements with researcher friendly design. There are also many others which are not mention here, because they are older ones and commonly used.

5. Suggestions for Software Enhancements

The enumerated modes of researcher's labour have a psychological peculiarity, A human being needs up to several days to reorganise the own knowledge and to 'morally and psychologically' prepare (Bulgarian researcher jargon) for anyone of them. A good creative organisation means to imaginary retrieve and pull to one place in the own human memory all pieces needed for one procedure of 'exploring' or 'putting down onto paper' methodological algorithms and objects for combining new generated knowledge and arrange methodologically an output of research results.

A convenient way to interact with a computer would be to tell the PC: "I am going to play my own game today according to my (methodological) rules. Please, shut up. I know you are very clever. But, please, suggest by those nice yellow boxes, where I am and how you can help me to orient or if you have some more similar information to the one I am working on. And, please, warn me any time I am going to make a mess by forgetting the boundaries of your capacity or to hurt my interest by my own ignorance. You know what I mean."

A manager's secretary very well knows what is meant then. She/he knows all emotional outbursts or being-pleased of the 'boss', being the mediator person among the modes of labour of the boss. A suggestion for the interaction 'boss - PC' is to place a second Start button on the task bar, e.g. called *'Research'*. It has then the status of an entry point for an interaction with the intellectual capacities of the computer for another user mode, but with the same User Domain. The attempt to execute a procedure from another mode may be possible, e.g. with a warning "You are leaving the …. Mode? Yes, No"

Entering in the Creative and Archive Mode an interaction with a PC by clicking the Research button, shortcuts appear to five meta domains organised according to methodological requirements in two levels of shortcuts and an optional (list of) temporary shortcuts for variations of intellectual routines. There must be a visible difference telling apart the methodologically necessary and the tenmporary metastrucutre. Each shortcut enrolls a list of shortcuts on a second level. This allows a simple, but methodologically valid, way of navigation in the Researcher's Archive. The meta structure of the Researcher's Archive is verified with the requirements of methodology of science [4, 5]. Learning it means learning better to understand the way of thinking science requires.

The entry point for the Programmes Interaction Mode is the ususal Start button, which creates a different metastructure with emphasis on PC inner life. Besides the few obligatory shortcuts enrolled in this list users establish shortcuts for frequently used data, programmes and routines domains or files. The metastructure here is very individual and flexible depending on the current research subject, object, experiment, etc.

A methodologically good organisation of research activities means to tell apart modes and apply consciously each of them a decided period of time.Further necessary enhancements in rough concern:

1. Searching in files contents in a cluster of directories (it is fact in emailing programme packages);
2. Arranging menus, untilities, shortcuts, warnings for the Research and Archive mode, Programmes Interaction Mode and Investigation Play Mode;

3. Arranging buttons and warnings for switching from one Mode into the other, while working on a piece of writing or design, and ensuring to have closed unfinished routines or cancelled them after having automatically executed a specific list of procedures from the viewpoints of security while interrupting the creative string of thought, management data organisation, programme functions preservation and stability of performance;
4. Arranging files, untilities, warnings for methodological units of scientific knowledge, for dictionaries and other specific methodological units of knowledge and their clusters, for management, partners', personnel and personal data for the Research and Archive Mode;
5. Arranging menues and buttons for methodological units of scientific knowledge, for dictionaries and other specific methodological units of knowledge and their clusters, for management, partners', personnel and personal data for the Research and Archive Mode;
6. Arranging buttons for dictionaries for the Research and Archive Mode;
7. Arranging utilities for addresses tranfer in different styles for different programme packages and for different purposes;
8. Arranging utilities for suggesting and help texts for explaining the proper organisation of the Researcher's Archive;
9. Arranging meta-information files for the Researcher's Archive, routines and utilities for its support;
10. Arranging help utilities and warnings on the methodological level for the Researcher's Archive and the different modes of using a PC; etc.
11. Designing eventuall data base features, if assumed to be efficient and by no means boring.

Many years of observation and research work have helped to estimate efficiecy priorities, balances between management and research creative activities, psychological and emotional reactions, psycho-energy needed to adapt to proper or improper automated intellectual routines, etc.

6. Conclusion

Experience has revealed, that young researchers, who have become familiar with methodological elements of creativity in science, are far more successful, their research results are faster obtained, more mature in content, better displayed and more clearly presented. Their self-conscience has increased, their team work shows stability. An enhanced software configuration is highly necessary, any 'losing the attention in details' is considered bothering. In this context being faster means also keeping better health and longer life expectation for equal efficiency, and, keeping in mind that a researcher is taught and trained at least 25 years, it means also a supplementary economic efficiency of the society.

Experience has revealed also, that researcher friendly programme design needs to be combined with teaching its purposeful usage from the viewpoint of science methodology. General education courses are organised at the Training Centre of the Bulgarian Academy of Sciences. There young researchers are educated the methodological elements and rules of creativity on series of examples, trained to recognise computer features, which support these rules, to ask for amending their computer and programme configuring or to do it themselves. Solving the problems described in this paper needs a continuous mutual work of psychology of user-computer interaction researchers,

methodology of science researchers, soft ware designers and scientists, who are only computer users. To design and commercially wrap up the interaction package of requirements is a great challenge for software designers. Sociological studies show a growing number of managers involved via innovations with scientists and vice versa, as well as an absolutely growing number of managers in management jobs or self-sustained. That means a growing social demand for the illustrated requirements and many similar ones, which for lack of space were not described here.

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Note: The studied literature is referred to in the listed author's publications. References are ordered in the sequence of citation.

Note: Listing of manuscripts shows time period of investigation and intermediate non-published lager descriptions of research results, published in shoter contributions later. For manuscripts contact kalaidji@mbox.cit.bg

General Hierarchy

Magdalena Kalaidjieva, Bulgaria

The recent enormous technical and technological development in information transmission and dissemination lead to spreading of more sophisticated knowledge-based methods and tools and knowledge itself. The ease of information and knowledge (I&K) distribution lead to 'circulating' it much faster, thus lead to the emergence of networks fluctuating I&K. Features like polyhierarchy and polythematics of general hierarchies (Cybernetics & Systems, 1997) are more frequently observed and used leading to and causing an easy transformation of an initial tree-hierarchy disseminating a new unit of I&K from the source, that is its AUTHOR, to other humans into general hierarchies and into networks with a growing degree of 'density', until it becomes the 'fully connected graph' – and this on a world wide scale.

General hierarchy (GH) plays an increasing role in ordering the 'wildness' of networking without destroying substantial cross-connections, which would get lost, if reduced to a tree hierarchy. The main features of GH are observed in living beings already on the physical-chemical-biological level with the emergence of the nervous system. This shows again the necessity nature had to respond to, in order to give living beings the ability to order their reflections and responses to the natural and societal environment.

On the psychological level polythematics is expressed e.g. in a child's exclaiming: "We don't want to talk about that now – these are two different things !" Whereupon the parent/adult explains how different things are fitted in a system.

Polyhierarchy on the same psychological level is traced back in the child's attempt to play the one parent/adult/child against the other one exploring systems networking in human relations and testing methods and tools of control and regulation, obedience and autonomy, power and leadership by and while constructing subconsciously, or to a certain extent after the age of 4 – 5 years quite consciously, an instrumental complexity, which is nothing else, but a case-based knowledge base – in the sense of information technologies and knowledge processing sciences.

Similar examples can be shown also for all other features of GHs on all levels of perceiving and response.

These ancient natural tools gain an immense foreground importance with the emergence and construction of the Global Information Society. The dynamic gestalt, dynamic understanding of fluctuations of structures on the scale between (common) tree-hierarchies, general hierarchies and 'amorphous' networks is needed and solves daily problems in domains like: a) Human relations, hence – conflict resolution, politics, geopolitics; b) Economic relations, hence – in connection with markets, democracies, employment, businesses networks, anti-monopoly regulations, credit and investment policy, etc.; c) Communication, hence – multimedia, world wide web, communication services providers, hence – education, research and development; d) Higher education, research, development, innovation and generation of new scientifically proven knowledge, hence – new

technologies and innovations; e) Any constructive activity, hence – intellectual development of humanity.

That is just to mention a few of the present areas of problems, where systems sciences work hard daily to help solving. Humanity seems to have found anew an old well forgotten tool to oppose the seemingly natural tendency of growth of tree-hierarchies, a plenty of tools to smooth them into self-regulating loops and observable controllable networks. It seems to have learnt to prevent the 'emergence & decay of empires' cycles whatever the scale of the 'empire' might be. Will humanity manage to keep and preserve from destruction its own cradle of life – is still an open question.

Money-Information

G.A. Swanson, USA

1. Introduction

An aspect of modern information processes that is typically neglected in discussions of information is that of money-information. This commentary is a short expansion of the discussions of the Team on "Design of Disciplined Inquiry on the Foundations of Information Sciences (FIS)." It provides some historical evidence, indeed some prehistorical evidence, of the intertwining of the development of money-information markers and the emergence of the concept of money. That development is an example of the process of semiosis (signification) as the sign "accounting unit" continues through time in a sign-web of related signs contributing to the emergence of the sign "money."

2. Meaning

Brier [2000], accepting Pierce's revision of Kant's philosophy, postulates a process of semiosis (signification) where firstness is a primary sign (representamen) that refers to secondness (an object) through the establishment of thirdness (an interpretant). The meaning of a sign emerges in this process as its effect on the biological, psychological, and social systems involved. The meaning of a sign in any sign-web, is continually evolving as a result of the social dynamics of those systems. And it follows that emergent signs occur in such a dynamic web.

3. The Concept of Money and the Emergence of Money-Information Markers

The concept of money (a sign) is highly complex and, likely, developed in association with the inventions of various artifacts designed to facilitate trade. In the Middle East, incipient forms of such artifacts began to emerge with the invention of a recording system about 8000 B.C. that used clay tokens to abstract accounting information. The process culminated with the invention of coins about 700 B.C. The concept of money emerged during this period.

The development of this complex concept involved many different ideas and inventions intertwining over time and experience. Development in counting, abstract recording, personal seals, and weights and measurements interacted to produce four fundamental characteristics of money: (1) accounting unit, (2) mobility or negotiability, (3) certification, and (4) value. "In the artifacts record, the developments of these qualities are often imperceptibly and inseparably blended, crossing and recrossing each other like subtle threads in a complex web." (Swanson and Miller, 1989, p. 40). The development has created a complex phenomenon that perpetuates a form of communication more powerful than most in that it is more likely than most to cause a person to provide economic goods and services.

4. The Evolution of the “Accounting Unit” Sign In the Emergence of the “Money” Sign

The following excerpt from *Measurement and Interpretation in Accounting* by Swanson and Miller, pages 71-74, provides a description of the influence of the “accounting unit” sign on the sign-web in which the “money” sign became dominant.

A distinction should be made between a counting unit and an accounting unit. A counting unit is one belonging to a quantified conceptual numbering system that does not depend on any concrete system for its value. The value of a counting unit is defined with reference to this conceptual system itself. On the other hand, an accounting unit is a measurement unit of a convenient commodity used as a common denominator to establish specific relationships between the exchange values of other commodities. Consequently, an accounting unit is always defined with reference to a concrete system element. Grierson (1977, p. 16) views such a measurement unit as the fundamental characteristic of money.

The evolution of counting is postulated to occur in the following order: (I) one-to-one correspondence, (2) concrete (sometimes termed "quality" or "objective") counting, and (3) abstract counting (Danzig, 1959, p. 6; Kramer, 1970, pp. 4-5; Flegg, 1983, pp. 8-14; Schmandt-Basserat, 1984, p. 49; Smith, 1951, pp. 6-8). Obviously, the objection, or matching, of one-to-one correspondence "suggests an abstract notion expressing a common property of the two collections, a notion entirely independent of the nature of their elements" (Ifrah, 1987, p. 14). Thus, the described development, notwithstanding the selected terms, is an evolution of abstract numbering that culminates in abstract counting.

The terms ordinal numbering and cardinal numbering also may be used to describe the developmental sequence of counting. Ifrah (1987, p. 24-25) argues that counting involves three actions: (I) assigning a rank to each object, (2) associating each object with all those considered before it, and (3) converting succession into simultaneity. Thus "the notion of whole number has two complementary aspects: cardinal, based only on correspondence, and ordinal, requiring both correspondence and succession."

Ordinal numbering (1st, 2nd, 3rd, etc.) is implicit, while not explicitly stated, in the idea of one-to-one correspondence. Moreover, ordinal numbering can occur without abstraction, for example, the time ordering of actors acting out creation myths of very ancient people (Boyer, 1968, p. 5; Seidenberg, 1962), and thus may be an earlier emergent than one-to-one correspondence. Both ordinal and cardinal (quantification) numbering can be absolutely abstract; that is, Ist, 2nd, and 3rd are no less abstract than 1, 2, and 3. Therefore, the evolutionary process from the most elementary form of numbering to the sort of quantification required by the modern interval and ratio scales of measurement may be usefully described on a matrix, as presented in Table 1.

This configuration highlights a connection between the evolution of counting and that of money-information markers. The incipient evolution of money-information markers might have contributed to the commonly postulated third evolutionary step of counting (abstract counting). Both "accounting units" and "rudimentary money-information markers 1, 2, and 3" (Table 1) are intermediary steps short of absolute abstract counting because quantity concepts are connected to specific concrete objects, either concrete system elements or abstracted but concrete models (representatives) of those elements. The same can be said of "primitive money" and "coins."

At this juncture, the evolution of money-information markers (with their multiple and intertwined characteristics) may be the dynamic that propels the evolution of the commonly postulated third step of counting (abstract counting). The tokens, representing real goods and services (concrete system elements) and coming to be valued accordingly (whether for coercion or incentive), provide a transitory vehicle for the abstract quantity "money" to be disconnected from the concrete system elements themselves used as

accounting units, for example, grain in Sumer, and connected to representatives of those elements. This step constitutes a sort of concrete abstraction.

In a culture where trade of commodities and services occurred among private citizens, and incipient government (temples) coerced exchange of commodities and services with artifacts of a recording and control system, it is likely that the two systems eventually mixed. Such cross-pollination between methods of accounting for governmental/administrative systems and market systems have been important historical influences on the development of modern accounting for profit organizations (Most, 1972, p. 732). With the emergence of tablets and writing, this first abstract, though objective, counting would have continued to evolve into an absolute (undifferentiated) abstract counting.

The accounting unit is clearly recognized in an artifactual record of the preliterate cultures of the Middle East. This record consists of clay tokens first realized to function as a recording system by Pierre Amiet (1972) and studied extensively by Schmandt-Besserat (1974-1987). This system used clay tokens to account for administrative transactions from about 8000 B.C. to well after writing was used in all parts of the Middle East (Schmandt-Besserat, 1983). Schmandt-Besserat clearly asserts that the concept of an accounting unit existed in this system. "The choice of meteorological units of grain for a more general use appears logical . . . because grain was the commodity most widely exchanged in the ancient Middle East. It played the role of currency and must have been, therefore, the most familiar accounting system"(l984, p. 57).

Burns (1965, p. 2) supports the notion of an early emergence of the accounting unit and the idea that the real good itself, for example, grain in Sumer, might not actually be exchanged in every transaction. Grierson (1977, pp. 17-18) says "money as a standard in fact lies behind money as a medium of exchange," and points out that the standard (e.g., grain) was not always used as the medium of exchange.

Schmandt-Besserat postulates that what we are terming "absolute abstract numbers" evolved from such accounting units or standards. Until the Babylonian period, ca. 1800 B.C., the cuneiform signs of the elaborate sexagesimal Sumerian system of numbers remained interchangeable with those for grain numeration. It seems likely, therefore, that in Sumer, abstract numbers derived from grain metrology . . . (which) provided a unique gamut of signs of increasing value which could conveniently be converted into the necessary series of numbers" (Schmandt-Besserat, 1983, p. 120).

Notwithstanding the persistence of the connection between cuneiform signs for numbers and grain numeration in Sumer for about 1,300 years (3100 B.C. to 1800 B.C.), the abstract quantity "money" may have emerged in the token system about 3100 B.C., as Schmandt-Besserat points out: Abstract numbers appear related to the invention of writing. This assumption is supported by the reduction of shapes in the token system after 3100 B.C., which suggests that the tokens had then assumed numerical values" (Schmandt-Besserat, 1983, p. 120).

The mobility of these tokens in economic actions suggests that the numerical values they were assuming were measurements of economic value—monetary value. Of the token system, Ifrah states, "The system was the remote ancestor of our present monetary conventions and it was also a precursor of written accounting" (1987, p. 90).

5. Conclusion

The epistomological basis proposed by Brier for disciplined inquiry on the foundations of information science is consistent with some evidence of the development of the complex notion of money. The interactions of the biological, psychological, and social systems in the process of signification through the evolution of meaning is particularly important in explaining the development of such complex, concrete-system-oriented concepts as money.

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Table 1
An Evolution of Numbering

	Concrete *System Elements*	*Artifactual* *Abstractions (Models)*
Ordinal Numbering	Time ordering of creation rituals	Bone tallies, calendrical notations ONE-TO-ONE CORRESPONDENCE
Transition Numbering	Human counting systems—(fingers, toes, multiple persons CONCRETE NUMBERING Trade of equal amounts of commodities CONCRETE COUNTING	Administrative token system ABSTRACT NUMBERING Abacus ABSTRACT COUNTING
Cardinal Numbering 1	Trade of differing amounts of commodities CONCRETE COUNTING RATIOS	Substitutions of differing amounts of administrative tokens representing different commodities ABSTRACT COUNTING RATIOS
Cardinal Numbering 2	Trade on the basis of a common denominator ACCOUNTING UNITS	Administrative tokens representing common denominators RUDIMENTARY MONEY-INFORMATION MARKERS 1
Cardinal Numbering 3	Accounting unit commodities used as medium of exchange—e.g., weighed metals PRIMITIVE MONEY RUDIMENTARY MONEY-INFORMATION MARKERS 2	Tokens representing absolute (undifferentiated) quantities of transaction value RUDIMENTARY MONEY-INFORMATION MARKERS 3
Cardinal Numbering 4	COINS Undifferentiated quantities of exchange value Calibrated on various monetary scales	

Picture 1
Assyrian clay tablet

Group 5

Designing Systems For Human Betterment

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Abstract

This group report is a synopsis of our four-day conversation. The conversation of the first day was an analytic divergence of the key constructs in the theme followed by a synthetic convergence toward reconstitution of the theme in more specific terms. The second day began with further examination of the theme leading to formulation of a set of 9 essential characteristics. The set was tested through presentation and discussion of 6 applications the second and third days. Our work moved toward closure by means of writing individually and in teams, then corroborating aspects of the group report, and finally planning the presentation of our process and results to the all participants the fourth day. Our group process typified one form of team collaboration and participatory action research that implemented the particular conversation design adopted by our group.

1. Introduction

The following thematic statement was published in the *IFSR Newsletter* (1999) to reconvene the members of the 1998 conversation and invite new members:

> *The influence of systems sciences is no where more needed than in areas pertaining to human welfare and the human condition. This conversation group will continue its 1998 focus on the relevance and applications of cognitive and systems to the design of human activity systems for human betterment. We wish to emphasis the nature of social and human oriented systems that reveal to us who we become, how we come to know our world, and the ways we relate to one another. We are especially interested in such systems as learning and learner centered education (caring) systems, systems that foster human development, personal and collective guidance systems, and synergistic win-win systems. These special interests are informed by what we have learned about human beings over the course of this century and can learn constructively from each other in this coming century. We believe that knowledge of the ways we think, feel, perceive, and inter-relate help us as designers to create and develop our systems for human betterment. We expect such systems to take into consideration our human welfare as well as the welfare of those affected by our activities. The globe promises to be a more holistic, interconnected and interdependent world community. Whether we like it or not, we are entrusted from now on as the stewards of all life on the planet. Therefore, our concern for the design of systems of human betterment must include the ecological, ethical, humane, and participatory dimensions in the broadest sense.*

Picking up the conversation from the group report (Collen et al., 1998), it was clear that we needed to reexamine the key constructs comprising our conversation theme and find a more specific and concrete focus of conversation, and thereby take our group process to its next stage of development.

2. Starting the Conversation

Our brief initial period oriented new and old members, acquainted each other with our styles of communicating, and established some ground rules to conduct our conversation. Members came from diverse fields and backgrounds. The theme represented a common draw for us. Diversity was important to solicit a range of perspectives at various points along the path of the conversation. An expectation of recognizing commonality and achieving consensus on essential stepping stones of the path were implicit to the progress of the conversation.

We reviewed what the group had accomplished in its 1998 conversation and provided an introduction of self for the benefit of our newcomer to the group, then the conversation gained focus by reconsidering the chief constructs contained in the title which served us productively in the 1998 conversation.

3. Design of the Conversation

We targeted the four key constructs of our theme: designing, system, human, and betterment. We agreed to share our views about them first as autonomous ideas, and then altogether, though this proved difficult in practice. The additional dimension of context was added, in that discussion of the conceptual system implicit in our conversation must be anchored in an environment which is always changing. Later in our conversation, this notion enabled us to focus efficiently and effectively on various applications each member brought to the conversation.

The scheme for the conversation methodology was mapped (Figure 1). We termed this figure our design of the conversation at this point. The figure shows the four key constructs of our theme as the key elements in interrelation comprising the conceptual system in context. Context for the moment was defined as our conversation, areas of application, and any specified environment in which designing systems might be applied in the course of our conversation.

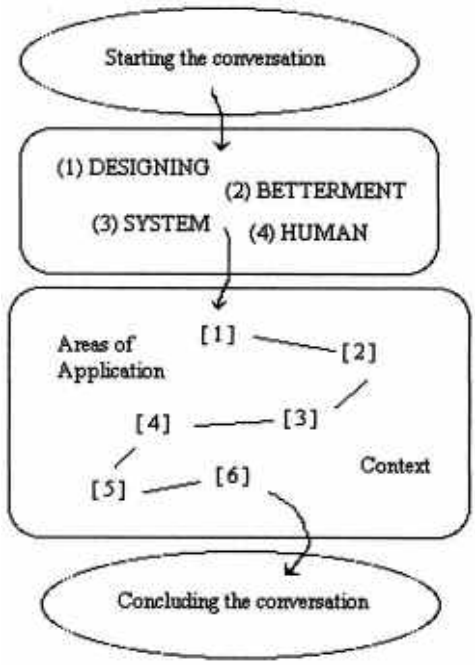

Fig. 1: Design of the Conversation

4. Key Constructs

Substantial time was spent exchanging views on the four key constructs. This conversation stage was necessary to understand one another and bring us together in the task of moving our process toward germination of something that might come from the conversation. As the conversation proceeded, the concepts became more contrasted, linked, and interrelated toward a group sense of the conceptual system imbued in our theme. Later the essential characteristics inherent in our collaboration became increasingly evident.

4.1. Designing

Design is often taken as an emergent product of the process called designing. In research, it is technically used to describe the organization of resources, people, space, and time needed to engage in the creation of something and the execution of a process. It is accomplished in a changing environment (context). Designing has functionality, process, and directionality. Designing is not deciding, predicting, and planning. There is an implementation phase after the designing phase. The designing phase involves specification of the system in that definition of functionality, project management, and process are described.

We discussed established schema which shows the place of designing in many creation and production processes (Figure 2). Designing is followed by implementation, which in turn is followed by maintenance. These phases involve cycles of interfaced feedback loops of verification and validation for analysis, specification, implementation, deployment, and maintenance. We noted that designing systems for human betterment may be viewed in the context of such a schema.

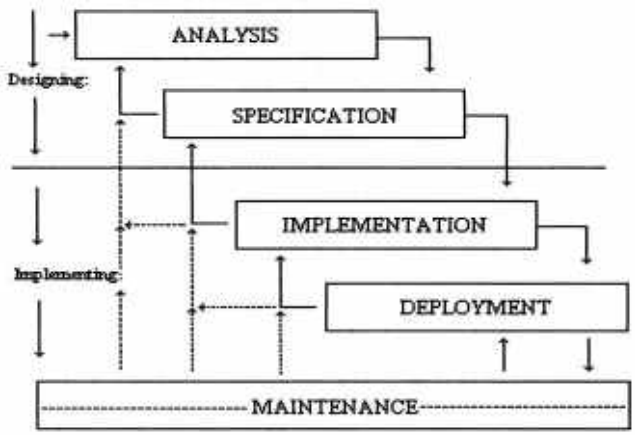

Fig. 2: Designing as process (Source: Boehm 1984)

4.2. Betterment

Betterment turns out to be a complex construct involving several aspects, as it is often a value laden and controversial idea. The aspects we discussed helped to suggest to those who are designing systems for human betterment what is meant by betterment. The stakeholders are all those affected for better and worse by systems being designed, who also need to be involved in the designing. The stakeholders include in the designing what is meant by betterment, and this value often is too implicit in and presumptive of the process. As the question immediately arises, betterment for whom? Who decides what is better, ameliorative, desired? Betterment involves ethics of the designing system. Ethics is inherently part of human systems and an open process, by which we

mean the engagement to learn, adapt, and change according to the context. Ethics of the designing system involves rules and laws, expressed and understood explicitly and implicitly regarding conduct and action, which must be distinguished from morals. These rules tend to become normative, e.g. a normative ethics for designing systems. A social system has an ethics, a collection of rules for interaction. We noted that one significant issue regarding ethics and betterment is that what may be betterment for one may be detriment for another. To illustrate, a retired person may benefit by a pension, but those who work to provide the money for this pension fund, from which the retired person receives his allowance, at the time may not view it as a benefit and wait many years to see benefit. What may at present better some stemming from contributions to the common good may not be evident for all persons. Here is a dilemma for designing systems for human betterment. We thought that designing needs to consider the individual as well as the common good, also the systems being designed and impact on its environment (superordinate system).

4.3. Systems

System was viewed more in terms of the interactions, e.g. activity among those who may be described as part of the system. Interactions among designers, interactions with environment, both natural (other persons) and artificial (machine interface) were discussed. The importance of purposiveness and communication was emphasized. The designing system may have many subsystems that interact. When a new subsystem is introduced, it changes the others. There is a progression of complexity when one considers more and more systems in interaction, which includes subsystems and the environment.

4.4. Human

The place and influence of the designer was discussed, especially in light of what is known of the observer effect on the phenomenon studied and the converse, namely, from physics (Heisenberg) and astronomy (Bessel). In human interactions, it becomes more acute as the effects are reciprocal. Therefore, in designing systems for human betterment, particularly in human activity systems, the coevolutionary (system-environment) aspects must be taken as given. However, there are different levels of organization to be considered. Three were discussed (Table 1). The anthropocentric point of view represents the classic position, the centrality of the human being, stemming from European influence. The need to control and remake the living environment for human betterment. That view has evolved to a modified view which specifies the need to keep the environment alive and sustainable to enable human betterment. The second level presented was the ethnocentric viewpoint. It represents the collective interest of an ethnic group of persons. Though facing the same dynamic and issue as anthropocentrism, it introduces the issue of the individual versus the collective good (betterment). The third level is the geocentric view. It places humans as the stewards and care takers of the planet for yet another superordinate level of common good, which suggests the imperative of a global ethics which enables betterments of both planetary life forms and peoples.

Centrism	Level	Betterment
Anthropocentric	Individual	Person
Ethnocentric	Communal	Tribe
Geocentric	Global	Planet

Table 1: Systemic levels of betterment

5. Converging the Conversation

The conversation required more synthesis after the explication of the key constructs. Designing is a dynamic collaborative process involving many human activity systems. Betterment is a more complex construct than is usually recognized. Systems is an abstract idea that needs to be linked to other concepts and context to make it meaningful for designing systems for human betterment. There can be many problems with extreme forms of anthropocentrism, ethnocentrism, and geocentrism. Betterment was taken to be the key emergent property. Goal was taken as idealized, in that designing systems occurs with a goal in mind but often changes as designing advances. The ethics of designing suggests various ways ethics imbues designing, such as imagining the best system, adopting norms to guide the designing process, generating as well as using reliable and proven-to-be-effective knowledge and practices taken as valuable to the designing process and the kinds of systems being designed.

Figure 3 was drawn to show the course being taken to implement the conversation design. It represented a step forward in detailing further Figure 1. Before our explication of the constructs, we discussed both our methodology and designing as a process pertinent to our team theme. Three aspects deepened considerably our ability to synthesize: recognition of the kinds of centricity (centrism), levels of complexity (organization), kinds of betterment (denotations). After pausing momentarily on these pads along the path of the conversation our collective exchange renewed. We moved to a more complex and at the same time more condensed view of the conversation theme.

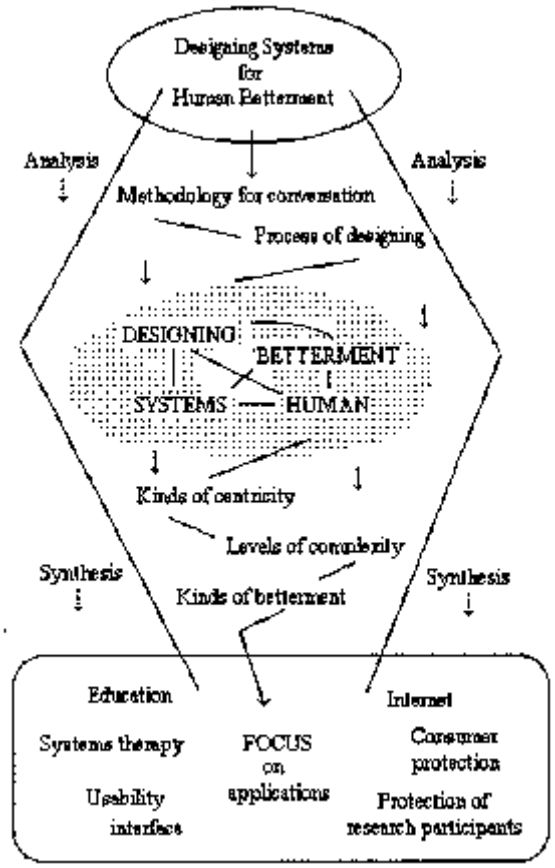

Fig. 3: Day 1 and 2 of the conversation

6. Essential Characteristics

Before moving to areas of application, we spent some time defining a set of 9 constructs considered central to our conversation theme. The fruits of our discussion are shown in Table 2. These definitions were thought about as essential characteristics to include and consider in taking up various illuminations of designing systems for human betterment. We did not take the time necessary to develop rather polished and fully agreed upon statements but roughed them out to general agreement to enable us to proceed further.

ACCEPTANCE: Betterments mean acceptance of its usage by those who are benefactors; people must want and use something, and not be imposed upon.
COEVOLUTION: Designing systems are in context; as the environ changes, so does systems; as one system changes so do others interactive with it.
CONTINUATION: Designing is continuous, never ending process.
CREATION: Designing is a creative process where betterment means discovery, understanding, invention, innovation, and amelioration.
DIVERSITY: Multiple points of view, actions, expertise, even if contradictory and conflicting; the opposite of ideology, groupthink, and homogeneity of viewpoints.
EMERGENCE: Process by which betterment becomes visible and evidenced from interactions of systems designed for human betterment.
ETHICS: Individual as well as collective good are incorporated in designing; ethics of decisions and process inherently involve ethical decisions, choices, and issues.
GOAL: The directionality of designing.
STAKEHOLDERS: Those active and affected by designing the systems for human betterment; kinds of experts in knowledge, experience, know-how; includes one who knows, one who has experience, one who is active (doer), one who may be outside and sees overview, and one who can anticipate the consequences of designing.

Table 2: Essential characteristics in designing systems for human betterment

7. Applications

Having composed a set of essential characteristics to consider and include in designing systems for human betterment, it became important for us to take up a number of applications to understand more fully and concretely whether the set would be relevant to various real world problems. We agreed that each member would present one application and relate it to the characteristics before opening the application to group discussion. In this way we obtained five illustrations of designing, but then added a sixth application which came spontaneously at one point in the course of our coverage. The subsections to follow are presented in the order they occurred.

7.1. Education

Many systems may be assumed to contribute to the emergence of educational systems. They have specific stakeholders, and to induce the emergence of educational systems for human betterment, they must be designed keeping the emergence process in mind. Systems involved are for instance, publishing, transportation, schools, telecommunications, and computers. The stakeholders are the students, their families, teachers, bus drivers, and other persons with a vested interest in education.

The systems must be designed to induce emergence from their interactions among the stakeholders. It means that they may not be designed to take care only of the effectiveness in use of resources, but must also include the expected usage, stemming from induction of emergence which can be recognized by the stakeholders as theirs.

7.2. Systems Therapy

Changes in family, groups, and institutions can become changes so disturbing that help is needed. Human systems therapy provides an example of such an intervention. Intervention is applied to reduce problems and increase satisfaction for those defining betterment. The therapeutic result is an emergent property of the effect of intervention in the system. Intervention means changes in the relationships, communications, and interactions (for example, through reframing). Stakeholders comprise the system, such as the therapist, family members, and observers. Therapy entails coevolution of all stakeholders. More diversity and healthier interdependence are sought. There is an optimal diversity with therapy, and the mutual acceptance of members is a necessity.

7.3. Internet

The rapidly growing internet is dramatically going to change the way we live. Contrary to other information resources like the book, newspaper and television, the internet with its services offers all kinds of information (text, picture, video, audio) via one integrated medium technology in a fast and easy way to every member of the human community. One major change to the antiquated information resources is that the internet offers all information independent from location and time. It does not concern whether the human is in USA, Italy, Greece or Austria when access is made. This difference seems to be very important because the book, newspaper, and television are often limited to a local area. For example, it is practically impossible to watch Austrian television broadcasts in the United States and buy the *Miami Herald* on an Austrian newsstand. Independence from time seems to be an another great advantage of the internet. Specifically, while information in the real world is often very time specific and news broadcasts occur five times on television during the day, the internet enables news access at any time.

Providing all kinds of information for all people in an easy and fast way independent from location and time is a situation that has never happened before. It demonstrates how easy this digital network can link up all people from different countries regardless of borders and political situations. Additionally, it seems that the internet is more or less independent from the natural language people are using. On the one hand, the English language is widely accepted as the internet-language for global information, and on the other hand, new techniques like automatic translation programs help to convert information from a local language into another language of our choice.

But today the internet is not only a platform to provide accurate information, but also a platform to communicate and interact with other human beings at the same (e.g. chat) or at different times (e.g. email). Further, the internet is a huge market place where everyone can buy different kinds of goods (such as books, CDs, food, and wine) independent from opening hours of stores and the physical location of sellers and distributors. Furthermore, the variety of online-shops helps us compare goods and prices. Another example how the internet can improve human life is planning vacations. By using the internet one can plan his whole journey including booking the flight, booking the hotels, making the car reservation and collecting all necessary information for the trip. In all, the internet helps to make the personal life more efficient and convenient for less time and money.

Of course there can be found more applications where the internet can contribute to human betterment, but there are also some cautions which have to be considered. Increasing human betterment via the internet means that (1) we must have access to it, (2) we must accept this medium, and (3) there must exist some regulations (ethics) which ensure a save life in the internet. These cautions point to the government and other public institutions which are requested to set appropriate actions, like building up and supporting the infrastructure as well as define laws for the internet usage.

7.4. Consumer Protection

In those countries with developed protection of their citizens as consumers by means of laws and regulations, one finds expiration dates on packaged food, ingredients stated on the labels of containers, and warnings and correct usage instructions on cartons and tags. These countries have agencies devoted to protecting the health and welfare of those who purchase and use the goods and services of society. Examples of these agencies are the Department of Consumer Affairs in California, the Federal Drug and Food Administration in the United States, and the Konsumentenschutz in Austria. These human activity systems are perhaps more obviously than others created and designed for human betterment. These systems can extend beyond the more obvious to the less visible, such as air, soil, and water. For example, the Environmental Protection Agency in the United States monitors the quality of air, soil, and water through ongoing chemical analyses for compliance with quality standards stated in federal laws.

Our conversation included extending the need for regulation and enforcement of extant standards to the impact of other systems which indirectly jeopardize human welfare. In fact, it is from many human systems designed for presumed human betterment that secondary impact emerges that only in future times, after the system has had much opportunity to operate and bring betterment to many that we discover byproducts of these systems which counter the betterments in other ways with detriments. Air, soil, and water pollution, some forms of food contamination, and urban deterioration are some examples.

We briefly discussed some contemporary controversies. The use of additives and preservatives in foods have received some substantial attention in politics and research, such as saccharin, monosodium glutamate, and fluoride. Further, we touched on the introduction of genetic manipulation to alter the color, skin thickness, size, and texture of vegetables, e.g. tomatoes.

The systemic aspects of this area of application were particularly illustrative to us of good intentions leading to aversive consequences. Designing of a system for human betterment brings an accompanying array of potentially and often invisible detriments, which may only become apparent to us in the future. We acknowledged and appreciated that our intentions are to do good, but we must be vigilant in our ignorance to likely unintended detrimental consequences. Typically it seems, we really do not know enough to advert all the negatives, but concern is growing we must know more to design systems for human betterment that incorporate the prevention of detriment, namely human and ecological protection, because of the increased rapidity in which newer systems promoted for the common good rush to implementation in the global marketplace.

7.5. Usability Interface

The application proposed makes reference to interface especially human-machine interface. However, with the expression human-interface we include as any kind of device that has a part dedicated to the interaction with the user. Usually the user must adapt to the interface designed, having in mind the functionalities of the device more than the user need. We noted the issue whether the human being must adapt and accommodate to the machine, or the machine to the human. Further, we pointed to the reciprocal cybernetic relationship inherent in usability interface and that prototyping is a process to establish usability interface.

We may have two kinds of interfaces: (1) Rigid interface, designed on rigid criteria which neglect the individual differences existing between one user and the other; and (2) Adaptive interface, whose behavior depends on the story of interaction between a particular user and the interface itself. The majority of the existent interfaces may be classified as rigid.

The main problem addressed in this application has been modeling of the user's cognitive system to understand what impact that on it of the information displayed by the interface, and how the user learns to utilize the interface itself in the most efficient way to reach his/her goals. As it has been introduced, the other problem addressed is the ability to learn. Still others problems are related to the availability of theories of attention, emotion, and memory.

We emphasized the difference between the concepts of use and usability. We have usability of the interface when it is easy to use, effective, easy to learn, and compatible with the mental schema of the user. We have use when the interface is just effective but not designed for the user need. We discussed the difference in regard to devices for the blind, deaf, and disabled, which enable them to overcome their dis-ability toward betterment, in the sense that they can interact and communicate with those who do not need these devices. Finally, we mentioned the Windows 2000 software commands as illustrative of our application, that can be disabled and made inactive, while others may be activated, to enable active customization of the software to the needs of the user.

This area of application emphasized for us that from the interactions among processes of memory, attention, emotion, perception, and knowledge representation, we have the emergence of an adaptive interface.

7.6. Research Participant Protection

In the United States the Institutional Review Board (IRB) is a concept as well as a human activity system designed for human betterment. Any human organization, institution, center, or facility that uses human beings as participants for research purposes must have a written research proposal scrutinized by a panel of reviewers (IRB) for the impact of the research procedures on the human participants. This is done for their protection. Usually there is a consent form to be read and signed. Many issues that have led to federal laws and regulations in this area apply in regard to human rights, confidentiality, coercion, informed consent, and usage of data collected. Further, many professional associations have adopted a code of ethics that includes research ethics, for example those of the American Psychological Association. These codes guide researchers and IRBs to promote and practice human protection.

As the other five areas, this area of application helped us to see more concreteness to the concepts discussed earlier. IRB looks at each case of a research project coming under its review for what

might emerge, particularly of a negative kind on the persons who participate. Each case reviewed has particular research ethics that tend to be characteristic of that project, and in broader sense, this area of application is extensive in its involvement in ethics. The stakeholders are not confined to the researcher and participants of the project, but often greatly concern the hosting institution, funding source, immediate community, and supervising personnel as well. Interestingly, there is an educational benefit that is available and often promoted when an IRB operates within an organization, such as a hospital, university, and government agency. Attention to research ethics enhances the general consciousness and organizational knowledge pertinent to human betterment. It may be that this kind of system for human betterment may serve to exemplify a means towards designing other systems for human betterment, but this idea needs to be explored and tested.

In summation, looking back over the six areas of application that comprised this portion of our conversation, we noted the variety of the subjects covered, not only their breadth in regard to society and types of human activity systems devoted to human betterment, but also the manner in which we chose to discuss each of them. There was no set rule about how best to discuss an application. Perhaps the ways we did are illustrative of choices that conversation groups have to incorporate the discussion of more concrete applications of their focus into the discourse of their conversation.

8. Designing Matrix

The next phase of our conversation was more integrative. The essential characteristics and applications suggested a matrix that may be of assistance in three ways to groups designing systems for human betterment. The matrix is shown in Table 3. For our conversation, the applications covered in previous section and contained in Figures 3 form the rows, and the essential characteristics described before the applications section and contained in Table 2 form the columns.

Areas of Application	Key Characteristics 1	2	3	4	5	6	7	8	9
A									
B									
C									
D									
E									
F									

Table 3: Application by characteristic matrix

Table 3 is meant to communicate an integrative tool for conversation design; it is not meant to dictate the structure of design. As one might imagine, any set of characteristics the design team consensually comes to as essential to their designing process may serve to form the columns of the matrix. Further, a diverse range of applications enables the designing process to test through conversation the viability of the systems under design.

Thus, firstly the matrix is a basic designerly and methodological tool to facilitate full discussion of various applications by taking up the cells (linkages) of the matrix through conversation. Secondly, the matrix provides a check list to examine systems claiming forms of betterment as emergent properties. This activity may be seen as evaluative. It may come in the form of a constructive critique and audit, and thereby ensure feedback to the design team, e.g. those in conversation designing the systems at various points in the process of designing. Thirdly, the use of the matrix may reflect those characteristics that have emerged as systemic values, a kind of valuation for the design team. This form of feedback brings appreciation and accentuation of those qualities of designing as a conversation process and of systems being designed particularly for those engaged in the conversation.

9. Summary and Conclusion

The process of the conversation consisted of an initial phase to orient the team to the task, followed by agreement on a design to conduct the sessions over the four days together as well as in relation to the other conversation groups. There was a daily progress report made to the the other groups, even though that aspect of our process is not detailed in this report. The heart of the process transpired over the middle two days culminating in an integration of contents produced into a draft for this group report by the last day. Prior to that, a group summary of our conversation was written and subsequently published (Collen et al., 2000). This final report was completed at a distance over the six months following our conversation proper.

As to the implementation of the design, the first day involved a divergent analysis of the key constructs in the theme: designing, betterment, system, and human. This phase was followed by a convergent synthesis toward reconstitution of the theme in more specific terms. The second day continued the reformulation of the focus, which subsequently led to the formulation of a set of 9 essential characteristics for designing systems for human betterment. These characteristics were defined: acceptance, coevolution, continuation, creation, diversity, emergence, ethics, goal, and stakeholders. On the second and third days, these characteristics were then applied to 6 areas of application: education, systems therapy, the internet, consumer protection, usability interface, and research participant protection. The conversation moved toward closure by means of writing individually and in teams, then corroborating aspects of the group report, and finally planning the presentation of our process and results to all participants on the fourth day.

The content of our conversation focused on the difference between the idea of designing a system and actually designing a system for human betterment, designing a system and designing systems, and conversing as a design team and working openly with the coevolutonary dynamics of conducting a designing process. We further noted betterment as a complex construct and chose to examine its importance as an emergent property. The stakeholders were seen as those who are the designers as well as those who may be affected more indirectly. Taking into account the participation and acceptance of the stakeholders became salient influences upon our thinking throughout the conversation. Systems for human betterment meant an increase in personal satisfaction, but these systems can also bring beneficial consequences at more collective levels of human organization. There were implicit subthemes over the course of the conversation, for example, that (1) betterments need to be accessible to everyone at the level of the systems designed, and (2) there is an ethics inherent in designing and the systems designed which likely needs to be made more explicit as the conversation progresses and the betterments emerge. Finally, our

conversation found that the combination of articulating and testing of the key constructs and essential characteristics with real world applications was a constructive means to conduct and then successfully conclude the conversation.

The fruits of the conversation were not only the personal experience with and knowledge gained about conversation design and collaborative inquiry through conversation for the team, but also the methodological products (specifically: conversation design, construct denotation, essential characteristics, foci of application, and linkage matrix) that can assist teams designing systems for human betterment.

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TROPOSES: Their functions and their possible contribution in changing human behavior

Nicholas Paritsis, Greece

1. Introduction

An intelligent system under the same inputs can generate different outputs. In systems theory there is the state space approach according to which the output of the system depends on the input and on the previous state of that system. Ashby (1952) makes clear that besides the variables that characterize the system and its state, there are also the parameters related with the field in which the system operates. By changing the parameters the behavior of the system change under the same input and under the same previous state.

Gestalts are perceived first and the gestalt influences the perception of details. Paritsis and Stewart (1983) also demonstrated in color perception that the whole is perceived first and then the parts. We perceive, act and decide taking into account specific contexts. Paritsis and Stewart (1983) during modeling color perception realized that human intelligence is polytropic. Namely that can be many alternative ways that the same human intelligent system realize the same function, e.g. perception. Equivalent to many alternative programs available for a simulation of the same intelligent function within the same intelligent system.

Cohen and Grossberg (1987), presented *the masking fields*, a processes by which the perception of reality is taking place under specific context, which when activated it consequently inactivates the other contexts together with the patterns that are related with them.

In systems therapy Minuchin, (1974) by changing the frame (context) in which a behavior or perception is taking place he succeeds to change the behavior. Also, by changing the relations in family which are the context in which a behavior takes place the behavior of the individual members changes too. The same happens with the culture of the family in which an event takes place. By altering the culture, the behavior of the individuals changes too. Nicholas Paritsis treated a number of patients by altering the frame of mind which was related with that behavior.

2. Contexts, troposes and change in human behavior

The basic ideas and assumptions which are put forward in this paper are that

1. *Contexts together with their related perceptions, affects, choices, beliefs and values, motivations and actions, they are forming a system which can be called tropos.* Contexts in the above sense can be states of the environment, emotions, needs, situations, logical contexts, past contexts related to past ways of thinking and responses, roles, e.c.t.r. In order to be better understood the concept of tropos, as background knowledge can serve Paritsis (1987) model of an intelligent

system of man. Tropos then can be a system of representations of the elements of level 2 and 3 at levels 4 and 5 in which (the last two levels) cognition and affect are integrated. Similarly, in a simplified version of Paritsis (1987) model presented in Paritsis (1997) paper, a tropos is a system of the representations of the elements of the lower level, at the higher level were cognition and affect are integrated.

2. *There is a mutual influence between*

   a) the activation of specific troposes within the members of a family (or of other human systems),
   b) the compatible to that troposes interactions and relations in the family, and
   c) the intelligence of the family as a whole (e.g. family troposes include specific family beliefs or myths).

   And vice versa (see fig. 1).

   This is because the output from one member of the family is input to the other, and the activation of a new tropos in one member can be widespread in the other family members. There is an ecology of troposes. A therapist who can influence all the family members at the same time can more easily change family members troposes at once. Thus the family interactions and relations do change. The process described in fig. 1. can be called *ecotropic.*

3. *A tropos and its context can be interrelated through another part which can be called zeugma, which can facilitate the activation or inactivation of troposes and their contexts.*

   Contexts can be in the natural environment reflected in the mind, or directly in the mind as in the cases of

   a) situations of the present or the past,
   b) stages of human systems intelligent development,
   c) the supra-systems in which the human system belongs such as families, work environment,
   d) human systems relations such as friendship, love, hate,
   e) particular interactions of the moment such as quarrelling, courtship, running,
   f) emotional states such as anger, fear, love, anxiety, depression, peacefulness, happiness,
   g) theories, beliefs, values,
   h) cultures, myths, religions,
   i) political or social organizations,
   j) nations.

3. Possible practical outcomes

After the presentation of these concepts, it can be developed a *tropos therapy* based on the activation or/and inactivation of particular troposes, being an active, non directive therapeutic method based on specific rational. Namely, that particular behavior, cognition and affect, are largely determined by the way that a person organizes and activate its alternative polytropic intelligence structures in order to achieve its goals and satisfy its needs.

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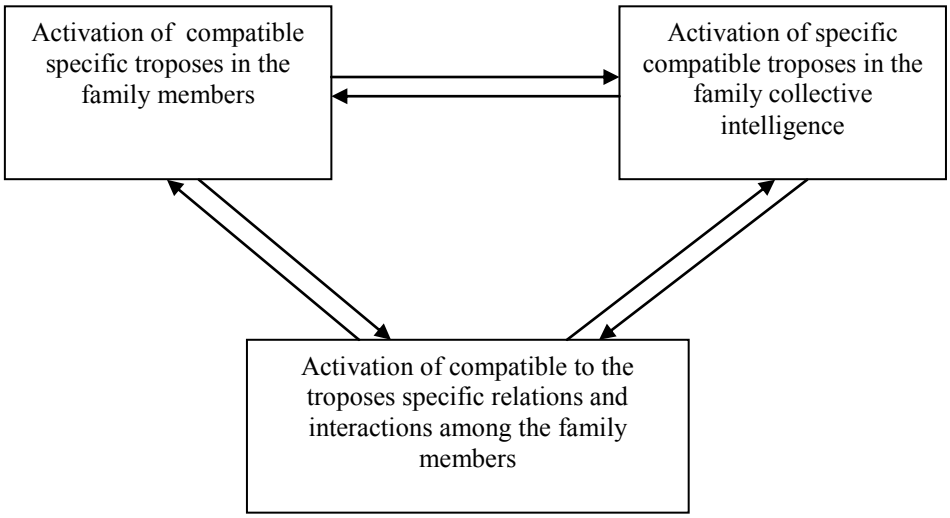

Figure 1. The mutual influence between a) activated troposes of the family members, b) the family intelligence as a whole, and c) the organization of the family.

Appendix

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Impressions ...

What is the IFSR?

Gerhard Chroust

Gradually the understanding grows that today's world can only be understood by viewing it as an intertwined network of systems. Our responsibility for the future obliges us to try to improve the current situation and not to leave an excessive burden to future generation.

Already in 1980 a group of far looking individuals around Bela H. Banathy recognised that it is not enough to have small nuclei of systems thinking in some countries: if our problems are international, so must be the network trying to answer them.

Since a system is more than its parts it was decided to interlink groups of system thinkers around the world and to try to find answers to some of the pressing problems of the world.

With the support of the Austrian Federal Minister for Science and Research, Dr. Hertha Firnberg and, within her ministry, especially Dr. Norbert Rozsenich, three important societies in the area of systems research founded the *International Federation For Systems Research* on March 12, 1980.

In the constitution of the Federation they said:

International Federation For Systems Research

The *Österreichische Studiengesellschaft für Kybernetik*[1], the *Systemgroup Nederland* and the *Society for General System Research*[2] recognise the need for closer international co-operation.

The aims of the Federation are to stimulate all activities associated with the scientific study of systems and to co-ordinate such activities at the international level. These aims will be realised by:

- co-ordinating systems research activities of private persons and/or organisations;
- organising international meetings, courses, workshops, and the like;
- promoting international publications in the area of systems research;
- promoting systems education;
- maintaining standards and competence in systems research and education;
- any other means, as far as they are legal in the respective membership countries and serve the aims of the member as formulated in their respective statutes.

[1] Austrian Society for Systems Research
[2] later Int. Society for the Systems Sciences (ISSS)

In June 1980, at their first Board Meeting, Bela H. Banathy defined the goals of the Federation as follows:

- **Social Learning Goal**: Strengthen the programs of member societies by their involvement in the program and network of IFSR.
- **Membership Development Goal:** Facilitate (encourage) the development of Systems science in countries in which such programs do not yet exist or are now developing.
- **Synergetic Goal:** Develop – implement – evaluate IFSR level programs to meet the purposes of IFSR; to advance systems science.
- **Resource Development Goal:** Identify an inventory of system science relevant resources, acquire those and make them accessible to member societies.
- **Global Mission:** Make contribution to the larger (global) scientific community and be of service to improve the (global) human condition and enrich the quality of life of all.

Three prominent representatives of the founding societies were elected as the first officers of the newly founded Federation: **George J. Klir** (Society for General Systems Research, USA), **Robert Trappl** (ÖSGK, Austria), and **Gerard de Zeeuw** (Systeemgroep Nederland).

In 1981 the first Newsletter of the Federation appeared under the Editorship of **F. de P. Hanika** *(see next page).*

International Federation For Systems Research

NEWSLETTER

AUTUMN 1981 Print of this issue — 4000 copies

Editorial Office: Prof. F. de P. Hanika, International Secretariat of the Austrian Society for Cybernetic Studies, Haus Hanika, A-8524 Bad Gams 92 to whom all material submitted for publication should be sent.

OFFICERS OF THE IFSR

President: George J. KLIR is a professor of systems science and chairman of the Dept. of Systems Science at the State University of New York at Binghamton, NY. He received his Ph.D. in computer science from the Czechoslovak Academy of Science in Prague. He is President of the Society for General Systems Research, Editor of the International Journal of General Systems, editor of two book series and author or editor of 12 books and over 70 papers in the areas of systems methodology, discrete mathematics and computer architecture and design.

Vice. President Robert TRAPPL (Ph. D, Vienna), Professor in the Faculty of Medicine, University of Vienna; Director of the Institute for Medical Cybernetics of the University; President of the Austrian Society for Cybernetic Studies, Vienna since its foundation in 1970; Editor of Cybernetics and Systems: An International Journal and General Editor of Progress in Cybernetics and Systems Research, Vols. I - XI.

Secretary/Treasurer Gerard de ZEEUW is Professor in the field of social change at the University of Amsterdam. He has a Ph.D. in philosophy and is board member of various Dutch scientific organizations; an associate editor of SYSTEMICA. He was for many years consultant in applied and pure research projects.

EDITORIAL

The IFSR wish to use this first official publication of the Federation to record their thanks and appreciation to Dr. Firnberg, the Federal Minister for Science and Research for her help in arranging the financial support and office accommodation for the Federation on behalf of the Austrian Government. Thanks are also due to the officials concerned in this matter, especially to Herr Rat Dr. Rozsenich, who took a leading role.

This is the first Newsletter to appear after the IFSR Annual Meeting of The Board of the IFSR. Some decisions taken there are detailed in our "Points" feature on page 3. Appearing three times a year, brevity of reporting will be our aim to present multum in parvo about activities, projects, programs and events organized by IFSR and its member societies as well as other items of interest to Systems and Cybernetic people.

Suggestions and contributions will be welcome and acknowledged to contributors.

IFSR GOALS

by Prof. Bela BANATHY

(Approved by the IFSR Board at its Meeting in June in Vienna, Austria)

- Strengthen the programs of member societies by their involvement in the program and network of IFSR.
  (Social Learning Goal)
- Facilitate (encourage) the development of systems science in countries in which such programs do not yet exist or are now developing.
  (Membership Development)
- Develop — Implement — evaluate IFSR level programs to meet the purposes of IFSR; to advance system science.
  (Synergic Goal)
- Identify inventory system science relevant resources, acquire those and make them accessible to member societies.
  (Resource Development Goal)
- Make contribution to the larger (global) scientific community and be of service to improve the (global) human condition and enrich the quality of life of all.
  (Global Mission)

Since then the Federation has grown, it now counts 28 members from 23 countries in several continents. They are:

- American Society for Cybernetics
- Asociacion Argentina de Teoria General de Sistemas y Cibernetica
- Asociacion Mexicana de Sistemas y Cibernetica
- Association francaise des sciences et technologies de l'information et des systems
- Bulgarian Society for Systems Research
- CHAOS - Centre for Hyperincursion and Anticipation in Ordered Systems
- Gesellschaft für Wirtschafts- und Sozialkybernetik
- Greek Systems Society
- Instituto Andino de Sistemas (IAS)
- Instituto Mexicano de Sistemas
- Int. Society for the Systems Sciences (ISSS)
- International Systems Institute
- Italian Association for Research on Systems
- John v. Neumann Society for Computing Sciences
- Management Science Society of Ireland (MSSI)
- Österreichische Studiengesellschaft für Kybernetik (ÖSGK)
- Polish Systems Society
- Polski Towarzystwo Cybernetyczne (Polish Cybernetical Society)
- Slovenian Society for Systems Research
- Sociedad Espanola de Sistemas Generales (SESGE)
- Society for Cybernetics + Systems Research
- Systeemgroep Nederland
- Systems Engineering Society of China
- Technology Transfer Center
- The Korean Society for Systems Science Research
- The Learned Society of Praxiology
- The Society of Management Science and Applied Cybernetics
- United Kingdom Systems Society

Some of the activities the IFSR can be proud of are:

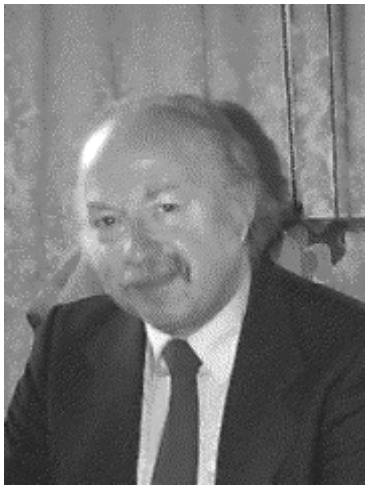
- *Systems Research and Behavioural Science*, a scientific journal: The official journal of the IFSR, edited by Michael. C. Jackson
- *International Series On Systems Science And Engineering*, a book series published by Wiley Inc., edited by George J. Klir
- The yearly *IFSR Newsletter*, distributed to all members of its member societies, edited by Gerhard Chroust
- A web-site informing the world about the Federation's activities (http://www.ifsr.org)
- bi-annual *Fuschl-conversations,* meeting every other year in Salzburg, Austria, discussing issues of social learning
- support for many other events (e.g. the EMCSR-conference in Vienna every second year)
- sponsoring a bi-annual Ashby-lecture at the European Meeting on Cybernetics and System Research

At the bi-annual Board Meeting in April 2000 the officers for the period of 2000/2002 were elected:

Prof. Yon Pil Rhee
President

Prof. Michael C. Jackson
Vice-President

Prof. Gerhard Chroust.
Secretary/Treasurer



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