

„Es war eine Unterlassungssünde, dass in den Nürnberger Ärzteprozessen neben den Ärzten, die ihre Versuche, statt an Mäusen und Ratten, an Menschen durchgeführt hatten, nicht auch die Medizin auf der Anklagebank saß, in der sie ausgebildet waren. Die Theorien, die sie dort erlernt hatten, kennen keinen Unterschied zwischen Menschen und Tieren.“

Thure von Uexküll¹

Integrating the biological and the social reality of the phenomenon of man in a system model

During the various sections of the international conference on “Ontogenesis and Human Life” various observers have presented various views or realities of the phenomenon of human life. Nowadays realities and models are scientifically derived products of our brain and they are only approximations to the perhaps ultimately undetectable entity of the phenomena. Since models influence the way we handle and interpret in everyday life the phenomena they represent, the importance of our current model of human life becomes evident as does our responsibility for the model, not only as physicians.

The current model of reproduction in man (*homo sapiens*) does not consider the world of humans “as lived”, i.e. the interactions of heterosexual partners in real time. Only biological facts (realities) set up by natural science discriminate between animals and *homo sapiens*. As humans belong to mammals and vertebrates too, these biological differences principally do not affect the efficiency of the actual model of reproduction in man in many fields of medicine (e.g. reproductive medicine).

The inadequacy of the current model of reproduction in man and the “need for a new model of man”² become evident, however, as soon as the relations and interactions of heterosexual partners within their living conditions (“*conditio humana*”) are concerned. In questioning the origin of individuals (e.g. family planning, abortion counseling) or mankind, i.e. regarding the ontological quest, for example, the everyday life of humans in real time achieves an utmost importance. Then the successively coming into existence of humans by interpersonal interactions triggering the biological processes is to be described exemplarily by two different models: one model representing the interpersonal reality of the partners within the everyday life of humans^{3 4} and another model representing the current biological facts of human reproduction. To draw an analogy, we cannot describe the phenomenon of light adequately with the particle or the wave model alone: we need both models in order to represent two complementary realities.

However, the description of human’s everyday life and of the biological processes in *real time* by means of an interpersonal *and* a biological model implies a lack of communicability. This is due to the fact, that the different realities are stated in different scientific languages or sign systems. By integrating the interpersonal and the biological reality or model either by

¹ Uexküll Th. v., W. Wesiack: Theorie der Humanmedizin. Grundlagen ärztlichen Denkens und Handelns. 3., völlig überarb. Aufl.- München; Wien; Baltimore: Urban und Schwarzenberg, 1998, S. 468

² Engel G., L.: The need for a new medical model: a challenge for biomedicine. Science.1977; 196 (4286): 129-36

³ Berger P.L., Th. Luckmann: The Social Construction of Reality. New York, 1966

⁴ McCall G. J.: The organizational life cycle of relationships. Handbook of Personal Relationships, S. Duck, Ed. (Wiley & Sons, Chichester, 1988), pp. 467-484.

translating them into everyday language as a common denominator or by integrating both models into a more *comprehensive scientific* model of man by general system theory⁵ and semiotics⁶, we may counter the fragmentation into various scientific disciplines and the estrangement of the phenomenon of human beings and of human life. Thus we may contribute to a “sustained reflection” on the “question of man”, which is “essential for a correct understanding of current cultural processes”.⁷

1. *The model of the constitution of species-specific worlds*

1.1 *In animals, vertebrates and homo sapiens*

It was not before the beginning of the last century, when the biologist Jakob von Uexküll established the “*biologische Umweltlehre*” on the basis of empirical physiological studies as a “science of signs sent and received by living organisms.”⁸ He showed that a living organism creates actively his individual phenomenal world as a subjective world by integrating himself into a complex environment. He becomes a part of it by sign-processes, i.e. by the perception and transmission of signals onto which meaning is marked according to her significance for the living organism. These sign related cause-and-effect-relations between the sensorial capacities (receptor system) and the effective (physical) capacities (effector systems) of the organism and the surroundings, correspond to and sustain the living organism as the centre of these sign-processes within its *Umwelt* enabling it to relate to sexual partners, prey, enemies and different objects (relations represented by specific functional cycles, i.e. negative feedback controls in organisms).

Since the sensorial and effective capacities differ from species to species, each species lives and moves in its own species-specific world though physically living in the same surroundings together with other species; in the world of a fly, there are only “fly-things” and in the world of a mouse there are only “mouse-things”. (To speak from reproduction in these animal worlds as occurring in their “social worlds” would be an inadequate anthropomorphism, since animals` worlds are built up and maintained by biological rules alone and not by negotiations between individuals and social sanctions). As the worlds of mammals and vertebrates are also constituted in that species-specific way by the sensorial capacities and the physical (effective) capacities of the organisms, the “outer world” of objects of mammals and vertebrates is similar to the “outer world” of *homo sapiens* in this respect.

Nevertheless the life-world created by *homo sapiens* differs decisively from that of other mammals and vertebrates by the ability of humans to create an additional “inner world” (“*Innenwelt*”) of his own in his imagination.⁹ This emergent property seems to be due to the fact that individuals of *homo sapiens*

- become able to call to mind objects, imagining them as continuing to exist even when they are no longer visible (object permanence),
- thus allowing humans from the age of two years onwards to constitute an “inner world” of objects in their imagination (denominated by symbols) as a stage of experimentation, without the need for immediate actions to which animals are subject
- thus releasing humans from inherited biological rules at least partially.

⁵ Bertalanffy L. v.: General System Theory. Braziller, New York, 1968

⁶ Nöth W.: Handbuch der Semiotik. Metzler, Stuttgart Weimar, 2. vollst. neu bearb. u. erw. Aufl., 2000

⁷ available: http://www.vatican.va/holy_father/benedict_xvi/speeches/2007/june/documents/hf_ben-xvi_spe_20070623_european-univ_en.html

⁸ Uexküll von J.: Umwelt und Innenwelt der Tiere. Berlin, 1909

Theoretische Biologie. 2. gänzl. neu bearb. Aufl. Berlin, 1928

⁹ Piaget J., B. Inhelder: Die Psychologie des Kindes. dtv, München, 6. Aufl., 1996, S. 61 ff – Piaget J.: Nachahmung, Spiel und Traum. Die Entwicklung der Symbolfunktion beim Kinde. Klett, Stuttgart, 1969, Band 5

1.2 *The construction of social worlds in humans*

The ability of constructing individual (inner) worlds enables human beings

- to develop their unique identity by intensive interaction with the “relevant others” of their social surroundings
- to build up individual life-worlds or subjective realities of their own thus becoming unique social elements or realities (of supreme importance in the field of medical education and practise; the patient as a subject)
- to express themselves by symbols
- to observe and interpret their species specific world and to prescribe their own rules for themselves by the use of reason, thus avoiding atypical situations and converting them into typical ones by individual or social actions in order to establish continuity in their living conditions and
- to contribute thereby to the permanence and reliability of everyday life or *Lebenswelt* of humans in general, which in *real time* augments the survival rate of humans as compared with non-human mammals and vertebrates.

In this context the ability of humans to perform symbolic interactions, code-adaptation and cooperative actions with other humans within their world is of absolutely extraordinary importance enabling the “*animal symbolicum*”¹⁰, a term coined by E. Cassirer,

- to build up a rational and interpersonal world (micro-social reality) out of two subjective realities, parts of which – similar to the parental genes - are transferred to offspring and are individually described in the first sentence of the *curriculum vitae*
- to construct larger micro-and even macro-social realities by their own rules (inter- and supranational realities or worlds) (Max Weber’s term “*soziales Handeln*”: social actions)¹¹
- to constitute specific interpersonal realities beyond the “*realissimum*” of everyday life¹², e.g. arts, science, spirituality, humanities (i.e. models of light, human beings, human life, everyday life), etc.

1.3 *Social actions attaching a second reality to ontic realities*

In contrast to the man-made character of social realities there are also ontic or pre-existing realities (either non-biological or biological realities, e.g. matter, plants, wild animals). Ontic realities, however, came into existence without any human interference. As soon as humans make use of pre-existing realities by social actions pursuing meaning the interpersonal (social) reality is attached to these ontic realities. This often makes it quite difficult to decide, whether an object or even a living organism in everyday life is merely a pre-existing reality or a twofold, i.e. an ontic *and* a man-made (social) reality.

- A wolf (like stones, wild plants) is only ever a biological reality, having come into existence once as a species, and thereafter reproducing himself as a “biological product” without any human interference.
- Poodles, stone wedges, parks, however, are ontic realities *designed by man*. The poodle, designed by breeding and thus man-made, physically lives within the same surroundings as human beings. The poodle has a bloodline, but no pedigree as humans have. The poodle will always remain an outsider of human everyday life apart from some rudimentary interspecies understanding.
- Human offspring are always biological *and* man-made, i.e. twofold realities, as procreated and socialised by relevant other human beings within the everyday life of humans. In con-

¹⁰ Cassirer E.: Versuch über den Menschen. Einführung in eine Philosophie der Kultur. 2. , verbesserte Auflage, Hamburg, 2007

¹¹ Schütz A.: Der sinnhafte Aufbau der sozialen Welt. Eine Einleitung in die verstehende Soziologie, 2. Aufl., Frankfurt/Main, 1930

¹² Berger P.L., Th. Luckmann: The Social Construction of Reality. New York, 1966

trast to poodles, however, human beings do not just live physically among humans, but they are insiders knowing the insider rules (i.e. the rules of the everyday life of their society) or they are able to learn the rules of other human societies, e.g. when moving to another country).

- In this context Immanuel Kant's view (1724-1804) becomes easily comprehensible differentiating between
 1. plants and wild or domesticated animals as non-rational biological products ("*Gemächsel*"), which therefore have a price, and
 2. humans as rational beings ("*Weltbürger*" or cosmopolitans) belonging to the "*Reich der Zwecke*", to which are assigned human dignity (in our terms: twofold realities and insiders of the everyday life of humans; no speciesism!).¹³

The unification of interpersonal and ontic realities constituting a twofold reality (poodle, man-made human baby etc.) occurs by social actions in everyday life. This unity gets lost, however, at that very moment when the interpersonal and the biological reality is represented by two contiguous but isolated models (i.e. scientific brain-children). This means in our context: the complex successiveness of heterosexual interactions and biological processes *in real time* is fragmented when described by two isolated models representing the interpersonal reality of humans on the one hand and the biological (ontic) reality of humans on the other hand.

1.4 Complementary realities and the lack of communicability

Neither the biological nor the social reality alone can provide an adequate description of the human being and human life and each reality fills in for the limitations of the other. They are complementary realities similar to the particle model and the wave model of the phenomenon of light in physics. Therefore sociologists or natural scientists can only present *their* specific scientific view or reality of the phenomena (though each of them is aware of the complementary part as far as it is an everyday knowledge). The inevitable neglect of the complementary reality by scientists, however, results in a reduced and distorted scientific model of human beings and human life.

- In medicine the "biomedical" model of man has dominated our scientifically derived view of human beings and human life for centuries. It is still considered the scientific model *par excellence* being responsible for the success of medicine as well as for its crisis, since the social reality of man could not be integrated in a satisfying way into the biomedical model until now.

1.5 Countering the fragmentation: by everyday language

The translation of the social and the biological reality contained in two different scientific models into everyday language enables us to counter the fragmentation of these phenomena and to reconstitute the cause-effect-relation between the personal interactions and the biological processes in *real time* (though parts of both scientific realities will necessarily be lost due to the translation into everyday's language).

Each pedigree for example, is the description of an interpersonal *and* a biological reality in everyday language. The pedigree is expanding in *real time* by social and biological interactions of the living and procreating members of the pedigree. That's why the pedigree contains positions, where children of fertile persons or couples may come into existence. One can define these potentialities, i.e. locations of the pedigree for physically not yet existing subjects, by criteria depending on the network of persons that already exist. Therefore the unique inter-

¹³ Kant I.: *Metaphysik der Sitten. Des Rechts der häuslichen Gesellschaft*, zweiter Titel: Das Elternrecht § 28. Available: <http://www.ikp.uni-bonn.de/Kant/aa06/280.html>

personal or social character of each potentiality is already fixed *before* an incarnate organism comes into existence in real time. The social character was even more important in the days of arranged marriages than the corporeal endowment coming along later in real time. At the very moment of fertilisation the unique pre-existing non-material social character (essence or “soul”) is united with the tiny organism. If no fertilisation occurs the unique characterisation of potentialities will persist unchanged and vanish over time due to infertility of the members of the pedigree.

The unification of the social character and the biological reality occurs *at the moment of fertilisation* within the interpersonally constituted micro-social reality of the couple which again is a part of the macro-social reality. Then parts of the interpersonal (biographical) reality of the couple, i.e. parts of the pre-existing non-material interpersonal reality of the parents are united with the unique biological reality which has developed from the pre-existing genetic endowment of the parents.

From the 20th week of pregnancy onward by the ripening of his auditory system the foetus

- acquires access to the interpersonal reality of his family in everyday life impressing this reality onto his body (comparable to loading software onto a data-carrying medium)
- starts to fit out his (pre-existing) subjective social character with latest parts of his unique interpersonal reality as a lifelong process
- exerts increasing influence on his social surroundings by his physical development, e.g. body movements.

The loss of parts of both realities stated in scientific languages due to the translation into everyday language may be countered by the integration of the social and the biological reality into a more extensive scientific framework and by the use of a meta-language as a common denominator. Thus even new properties become apparent which were not recognizable before.

2. Towards a more comprehensive scientific model of man and of human life

2.1 Methods

General system theory is an interdisciplinary field of science studying the nature of complex natural, social and scientific systems providing a formal interdisciplinary scientific theory of interacting elements (subsystems). The elements form a whole when taken together. The quality of various realities or elements can be classified according to Schütz.¹⁴ Within this framework and for our purpose we can analyze and describe the biological and the social reality working in concert. According to their appearance during the evolutionary process they are represented by two interacting elements constituting a hierarchically-structured system model of man. In this system new properties emerge that are not yet present in the separate elements.

Semiotics, the study of signs and symbols, provides a common denominator for various sign-systems (codes) or realities. Thus semiotics can describe the interactions of the vertically arranged elements within the system model of man by sign-related cause-and-effect relations. They occur *within* (horizontally) and *between* (vertically) these sign-systems or elements as *linear* triadic sign processes (“semioses” or “flows of signs”) being pushed forward by a signaling or an instrumental behavior of numerous interpreters (cells, structures or persons) showing a linear sign-process between the elements (“downward effect”, top-down causation) represented by a chain of interconnected general models of semiosis¹⁵. In contrast to this linear sign process the interconnection of the elements of the system and the surroundings is described by *circular* sign-processes (Funktionen- and Situationskreise by J. and T. von Uexküll)¹⁶.

¹⁴ Schütz A., Th. Luckmann: Strukturen der Lebenswelt. UVK Verlagsgesellschaft mbH, Konstanz, 2003

¹⁵ Krampen M.: Models of semiosis. In: Handbuch Semiotik: Ein Handbuch zu den zeichentheoretischen Grundlagen von Natur und Kultur. Hrsg.: Posner R., K. Robering, T.A. Sebeok. De Gruyter, Berlin, New York, 1997

In the case of considering a person as “surroundings” *in real time* an interpersonal relation is established and maintained by the common interest of two persons. The interpersonal relationship can be represented by two hierarchically structured subsystems (representing two persons) consisting of various elements which are integrated by upward and downward effects as mentioned above. The interactions of both subsystems are represented by horizontally interconnected circular semioses (*Situationskreise*). Thus a supra-system is constituted enabling a never-ending code adaptation process by “meaning testing” and “actions testing” in the imagination of each subject on an interpersonal level (by *Situationskreise*) or interactions on a biological level (*Funktionskreise*). On the interpersonal level meaning conferral and meaning use is performed by a specific action – either by a signalling or an instrumental behaviour, the meaning of which is to be defined by the interpreter’s interpretant and then again answered by further actions of the subject and so on.

2.2 Consequences for our view of human life

In heterosexual supra-systems procreation emerges as a new quality as compared to the fertility in each subsystem representing only the precondition for reproduction. Sexual interaction and reproduction can then be described by linear semioses (“flows of signs”) simultaneously running downward in each subsystem from the interpersonal level via the sex organs to the inter-cellular level always using structures that already exist. The flow of signs then crosses the gap between two generations on the cellular level. The interactions of the germ cells take place as a circular semiosis within the biological element of the female subsystem. It may be described as a bio-semiotic (basic epistemological) process since one germ cell has to find the corresponding counterpart.¹⁷ By the actions of interpreting, signalling and acting subjects (cells, functional elements, organs inter-organic structures etc. represented by the general model of semiosis) the organism of the embryo autonomously (by his own interpreters) maintains a sign-related interaction on a molecular level, i.e. a bio-semiotic signalling event (or “cross-talk” with the maternal organism enabling his implantation and further corporeal development. From the 20th week of pregnancy onwards, as already mentioned, additional parts of the source-related reality are actively perceived by the foetus and engraved into his organism. Thereby, the uniqueness of his given social reality is being integrated into the Self. After sexual maturation parts of the social reality of this person are transmitted to the off-spring assigning unique historical and social position to them.

In a cross-generational view the phenomenon of human life appears as a theoretically “endless semiosis”, a term coined by C. S. Peirce in another context. As already mentioned the “flow of signs” runs downward from the interpersonal level through various structures of the organism, which are described in various branches of the humanities and sciences.¹⁸ By finding one’s cellular partner on the level of the germ cells a new organism is constituted as a twofold reality developing autonomously to a sexually and socially mature person finally. Then a heterosexual supra-system is constituted and procreation may continue.

As the flow of signs is oscillating between incarnate (“corpuscular”) individuality and heterosexual bio-social potentiality in the course of time, all the types of these structures are created again and again in infinite variety.

Many questions remain unsolved: where does the flow of signs come from? When did it begin? Where is it going to?

¹⁶ Uexküll Th. v., W. Wesiack: Theorie der Humanmedizin. Grundlagen ärztlichen Denkens und Handelns. 3. , völlig überarb. Aufl.- München; Wien; Baltimore: Urban und Schwarzenberg, 1998

¹⁷ Huber J., I. Schmid-Tannwald: A Biosemiotic Approach to Epigenetics: Constructivist Aspects of Oocyte-to-Embryo Transition. Marcello Barbieri (Ed.): Introduction to Biosemiotics. The New Biological Synthesis. Springer Netherland, 2006, 457-471. ISBN-10: 1402048130

¹⁸ Schmid-Tannwald I., J. Huber: Human life: an endless semiosis through different human sign-systems. Gatherings in Biosemiotics 6, Salzburg, Austria, 5-9 July 2006; <http://www.biosemiotics2006.org/content.php?id=74>

To answer these questions other disciplines are invited to make their suggestions on the basis of their own realities.

Summary:

A human being is not only a biological reality (*homo sapiens*), but also a social reality (*homo socius*) since humans are generated, grow up and live within the everyday life of humans. The human *Lebenswelt* is an interpersonally constructed reality differing decisively from the world of animals. The twofold reality of humans and their relationship to human's everyday life accounts for the attribution of dignity to humans, instead of a price to plants and animals as was already suggested by Immanuel Kant two hundred years ago.

General systems theory and semiotics enable the integration of both complementary realities into a more comprehensive scientific system-model of man. Two combined system-models interconnected by circular sign-processes forming a supra-system represent a heterosexual partnership with the property of procreation.

Thus human life can be described exemplarily as a never- ending flow of signs through different realities (elements or sign systems) oscillating between potentiality and individuality and finally creating all human beings ever lived and their history.

Author's address:

Prof. Dr. med. Ingolf Schmid-Tannwald

D- 80336 Munich

Pettenkoferstr. 8 a

Tel:++49 (0) 89 5160-7488

e-mail: ingolf.schmid-tannwald@med.uni-muenchen.de