EPISTEMOLOGICAL AND ONTOLOGICAL TOOLS FOR AN EXTENDED VIEW OF A HUMAN PERSON AS A SOCIAL BEING AND ITS ENVIRONMENTS

Part 1: Considerations about ontological and epistemological options and restrictions

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ABSTRACT. *The actual situation demonstrates: Complex problems dominate more and more health and sustainability. Between the related human and natural sciences are irreconcilable gaps because of epistemological and ontological reasons. Therefore we should discuss the options for adequate philosophical tools. The Extended View is such a proposal. Its basic assumption is: All related disciplines accept an autopoietic evolutionary process and the power of science. The incompatibilities could disappear if we would have a model for an evolutionary process which covers the material and immaterial aspects of all health and environment related aspects. Part one deals with the offers and restrictions of available ontological and epistemological positions, e.g. the ones of Einstein and Aristotle. Differences between the aims of philosophers and scientists using philosophical tools for their applied problems are pointed out. The analysis results in a list of principles which should be respected within the Extended View, e.g. autopoiesis, equivalence, relativity, symmetry, restrictedness, sparsimony, semantic correctness, the linkage of information to matter or energy, but also the problem oriented use of the plurality of epistemological and ontological positions and the different nature of terms and that for what they stand for – with the consequence that the theory defines what can be observed. Challenges for the Extended View as the needed integration of the autopoiesis of life from inanimate precursors were obvious.*

KEYWORDS: *sustainability, health, evolution, Extended View, paradigm, Einstein, principles, equivalence, relativity, symmetry, autopoiesis, causality, restrictedness, semantic correctness, simplicity, parsimony, speculative nature of thought, indeterminacy*

Content

I. THE ACTUAL DILEMMA AND THE HOPE FOR A SOLUTION

There is a philosophical dilemma with medicine as a science – and more or less all other applied disciplines dealing with human and natural scientific aspects. This problem is widely accepted within the scientific communities latest since 1977 when Engel published in *Science* his famous paper about the need for a bio-psycho-social model (Engel, 1977). These applied disciplines would need an "interface" between the differently used scientific frames. Engel proposed the use of General System Theory for the evolution based hierarchical structures of a person. This proposal could not be realized up to now because of epistemological and ontological incompatibilities. The GST is powerful on each level of the structure and within the frames of the related scientific disciplines. But it was so far impossible to create an interface between them. The key-problem was to bridge the gap between body and psychosocial mind (Tress & Junkert, 1992). The dilemma has increased in the meantime: Now not only the body-mind problem is obviously incommensurable but of high relevance. Similar gaps are given between individual and society, between physical and mental reality and virtuality, between materialism and idealism, rationalism and empiricism. They are of increasing relevance even for daily life. The gaps are not caused by the nature of the research objects, but by the way scientists are observing the same from different positions[1]. Therefore we should use additional philosophical tools, modify them problem oriented and create such ones if adequate philosophical tools are not available yet. The final goal should be ONE scientific frame which covers all health related aspects, but without the loss of power of the actually given scientific instruments.

Unification can be started with axiomatic assumptions which are accepted jointly: All health and environment related scientific disciplines accept the principle of an autopoietic evolutionary process and that all the existing consists just from quanta (Kofler 2012). Therefore there is the chance to create an interface between all related disciplines on the basis of scientifically appropriate epistemological and ontological tools: If we would be able to invent a model for an autopoietic evolutionary process which covers all health-related aspects within one frame, then the incompatibilities between the physical, chemical, biological, emotional, intellectual, social, virtual etc. aspects could disappear. The "oldest" health related entity is quanta. Therefore the model should allow to make plausible the autopoiesis of quanta from the basic assumptions and the following autopoietic process up to now – as far as it is relevant for health and complex sustainability.

II. SPOTLIGHTS ON POSSIBILITIES TO SUPPORT THE EXTENDED VIEW WITH ADDITIONAL PHILOSOPHICAL TOOLS

The "traditionally" used philosophical tools like Popper's logic of science, Aristotelian logic, basics of epidemiology etc. are assumed as known.

[1] See Einstein: "Body and soul are not two different things, but only two different ways of perceiving the same thing. Similarly, physics and psychology are only different attempts to link our experiences together by way of systematic thought." (Autograph 1937, Einstein-Archive 28–389)

The selection in this paper is done from the position of a non-philosopher but with respect to their relevance for the Extended View.

II.1.1. *Paradigm and paradigm shift*

The understanding of the nature of world views has changed dramatically especially after the work of Th. Kuhn. In former times "world views" have been understood as the final objective knowledge about the true nature of our world. These views were often closely related with the dominating religious system within the related societies. Kuhn could document that the understanding of what is the "true nature" has changed again and again and will change constantly in the future. He used the terms "paradigm" and "paradigm shift" to express this – in the end – social change.

Therefore there is no more reason to insist dogmatically on a paradigm.

II.1.2. *Hypothetic nature of the actual state of knowledge*

There is a general agreement within the different scientific communities that no science is capable to reach observer independent objectivity. This position is also accepted for the "hard scientific disciplines" – especially in consequence of quantum theory. This agreement covers – in agreement with Popper, Bacon and many others – the position that the actually accepted state of knowledge is of hypothetical nature and can be falsified by experiment. Unsuccessful experiments to falsify an alternative hypothesis confirm the hope that the alternative hypothesis deals adequately with nature, but does not allow a final confirmation. Therefore one experiment can only falsify an alternative hypothesis but cannot change the state of knowledge. Its change – after sufficient numbers of not falsifying experiments – is a social chosen convention. The procedure takes time – as the author has learned by the change he could realize in context of the principles "placebo" and "white coat phenomenon" by the additional accepted principle of "toxicopy" and its nature as the new "ground set" which covers white coat phenomenon and placebo (Kofler 1992).

II.2. Experimentum crucis and the power of theories of principle

There are conditions which are of special power to support an alternative hypothesis, but within the frame of the principle of the hypothetical nature of any theory: One is the so called "experimentum crucis": The negative output of such an experiment would – because of an additional social convention – not allow to save a falsified alternative hypotheses by its further extension.

Such an experimentum crucis was made to test the power of the "Extended View". It confirmed the hypothesis (Kofler at al. 2001).

Another condition to confirm the power of a new theory was developed by Einstein: He created a technique to unify accepted but former unlinked axioms by the modification of the content of jointly used terms in such a way that the new formulation of the term allows unifying the use of the axioms because of an additional fundamental principle which is acceptable and compatible with the former used. He called theories on this basis "theories of principle". This technique was used for the Relativity Theories. The modification of the formulation covers all cases of the former use.

Therefore all experiments which are the basis for the acceptance of the different axioms/principles can be used to enforce the assumption that the extended terminology is in a good correlation with what it stands for in the given world. In Einstein's case the modified term was "movement". He connected successfully on the basis of the epistemological principle of semantic correctness the physical principles of the speed of light as a natural constant, the Lorentz-transformation and the calculus of Poincare, the relativity/dilatation of time and the relativity of contemporaneity within his Special Relativity Theory and the principles of the Special Relativity with a generalization of the equivalence principle which was historically based on the understanding of heavy masses of Galilee and Newton, on natural processes in general and the epistemological and ontologically based assumption of parsimony and inner symmetry within his General Relativity Theory.

The epistemology which is used for the "Extended View" is based on the technique which was developed by Einstein for his Relativity Theories as theories of principle.

II.3. Terms, principles and natural laws as free inventions of the human mind

Widely accepted are other conclusions of Einstein about the relation between the outside nature, observations, the used terms to communicate about them and their use for thinking, especially scientific thinking: The incompatibilities e.g. between the classic mechanics of Newton and the electromagnetism of Maxwell are not based on incompatibilities of the nature of the research objects of mechanics and electromagnetism, but on the incompatibilities of the terms we are using to deal with the related aspects of their nature – in this case with the special aspects of mechanics on one hand and of electromagnetism on the other hand. Any term – and therefore any natural law, because of the need to be expressed by terms – is a "free invention of the human mind" and can be authorized only with the aim to deal better with our world thanks to their help. Terms simplify. Therefore each term skips aspects which seem to be negligible for the information which should be given. Mechanics and electromagnetism focus on different aspects of one (unique) nature. Therefore we should expect differences between what can be skipped out and what not. As a map is not identical to the territory it shows, terms are of another nature than that they are standing for. Therefore the theories we are using define what we can observe and in which way we have to interpret the observations.

Therefore it is relevant for e.g. the Extended View
to give respect to semantic correctness.

II.3.1. *The theory defines what we can observe – and in which way we have to interpret it – a thought experiment*

This is valid not only for the epistemological tools but also for our ontological positions and interdependences between ontology and epistemological principles. Even the decision about the accepted abilities and other assumed characteristics of nature of entities and their interrelationships must be formulated with terms with related meaning. The decision what kind of characteristic is accepted is in principle free but must be in agreement with the empirical facts. But it is part of the free decision what kind of causes

(and related abilities of the entities) are accepted to explain the sense-experiences. The consequences for the explanations which have to be given within an accepted set of ontological principle can cause totally controversial explanations for the same empirical fact.

An impressive example – which the author has adapted for medical use – is given by B. Russell. He presented it to explain the relevance of the decision for an ontology in context to make understandable the world view of Einstein (Russell 1997).

We postulate different demons. Each of them knows the whole of the actually given knowledge and should be able to recognize all what is possible to observe – but just up to the evolutionary level of the different scientific disciplines the demon has reached: One should be restricted on physics, the next should be able to handle also with biology, the next additional with psychology and the last with comprehensive medicine. All observe the same: entities are moving after a sound event away from another entity: The "physic-related demon" can observe 6 smaller masses moving away from one much bigger mass after a sound occurred. The explanation of this demon would be based just on physics. Its explanation would be: The smaller masses are moved away passively by a repulsing power coming from the big mass. The "biology-related demon" is able to distinct that the smaller masses are humans and the big mass a tiger in a cave. The sound was produced by the gate of the cave moved by the wind. Therefore the humans show a stimulus response reaction and move actively away from the tiger. The "psychologist" would interpret the same as the consequence of the intellectual perception of the danger which is caused just by the information about the presence of it, which would be plausible even without the existence of the real tiger but by plausible stimuli about it. This reaction would take place even if we just give the information to the persons without a really existing tiger. And the "medical doctor demon" would be able to explain why one of the persons did not react at all but goes further on directly in the direction of the tiger. This demon could distinct between mentally healthy and mentally ill persons. If the person would give the explanation that he is the trainer of the tiger and knows that there is no danger for him then this would be a healthy reaction. Or his diagnosis would be: This person is mentally ill because he believes to be Mowgli, the child from the *Jungle Book* and the tiger is his friend.

This thought experiment demonstrates: Even the decision about active or passive movement depends on the ontological position! Only the acceptance of principles decides if we accept the classic four causes according to Aristotle for a necessary and sufficient explanation of it and if it is enough to describe the follow up of processes and skip the rest. Russell used this example to explain his assumption about the world view of Einstein: That even particles guide themselves in such a way that they move actively away with the intention not to collide with each other. Heisenberg would possibly agree with such an interpretation[1]. Einstein though would not have been very happy with this explanation. He preferred to introduce unphysical terms into physics to cover the open problem of the final cause. He explained the efficiency of gravitational fields with the

[1] Heisenberg proposed to accept the potentiality of quanta and particles to have a free choice for modification of movement – within strict borders. Compare Heisenberg: Physics and Philosophy – The revolution of modern science, 1958

comparison "ghost-field", not consisting of matter or energy[1]. The "ghost-field" acts similar to a direction sign to guide the masses/energy in the most economic and easiest way following the geodetic line. But what help does a direction sign provide if you cannot read it? Nevertheless, we should not forget the basic position of Einstein: Even ontological positions are free inventions of the human mind, which are justified only by their applicability to handle problems. And his position was different to the position of Heisenberg. But at the latest the understanding of higher animals and of course human persons as social and cultural beings cannot be handled sufficiently without the adequate level to deal with information. Therefore there is a semantic incompatibility between the ontological position of physics about the nature of quanta and the agreement that all that exists in the given world consists just of quanta – and of nothing else. An ontological position in physics excluding all interdependencies between the axiom of the nature of quanta and the needs of biological, psychic and social phenomena of entities consisting just of quanta and nothing else is a social commitment and maybe helpful enough for physical problems.

But we should not expect compatibility of physics with life sciences and human sciences without an appropriate answer to the question "Thanks to which ability entities including quanta are able "to make a difference to a difference" and to attribute meaning to structure. This is a key question for the Extended View.

II.4. The extension of paradigms for relationships dealing with observer and observed – their integration in principles (relativity, transformation, symmetry, equivalence)

The most famous shift in ontology is the Copernican Revolution: The knowledge that not the sun is moving around the earth – as we have the unchangeable impression – but the earth around the sun[2]. Kant reclaimed the deduction of the Second Copernican Revolution: That any statement about an empirical fact is a statement about the speaker too. And this should primarily not be understood as consequence of restrictions of the physiological nature of the human species, but because of the experiences, acquired value systems etc. of any individual person. From this point of view we can understand the experience of Th. Kuhn that scientists modify unconsciously and consciously the relevance of logically correct arguments about basic ontological positions ("paradigms") according to their outer-scientific interests as a special case of the Second Copernican Revolution. The key-point behind this revolution is that the energetic aspect of an empirical fact is the attribution of content/meaning to it. Another indispensible fact is that without this attribution no scientific communication, no report about an empirical fact is thinkable. Therefore there exists no objective observation by scientists.

[1] Do you remember the definition of information by N. Wiener: "Information is information and not matter or energy" and: "Information is a difference which makes the difference".

[2] Psychology of perception teaches us, that there is a choice to attribute movement to the observed or to the observer. If you are sitting in a resting train and look through the window to another standing train close to your train and one train starts to move, then you may not be sure: Is it your train moving or the other one? You have to decide this question comparing your position with other objects you believe not to be moving. Per "evolution based" definition the earth does not move.

This argument makes plausibly why Einstein distinguishes between the empirical facts on one hand and sense-impressions/sense experiences on the other hand and why he focused on the speculative/intuitive and constructive nature of thought. This aspect is indispensible for the creation of principles and therefore for any science. We need terms to communicate – in daily life and within the scientific community. Therefore the key point is – as pointed out above – the creation of terms and their linkage with meaning. Any term we (the observers) are using to communicate about observations is just the free invention of the human brain[1]. These aspects are integrated into Einstein's epistemological technique which he used to create the Relativity Theories – as will be pointed out in more detail later.

Einstein caused another ontological shift using this modified understanding of empirical and rationalistic science: The unity of energy and matter on the basis of "Special Relativity". This was nearly a falsification of one of the "Seven World Riddles" formulated by Emil du Bois-Reymond. "Ignoramus and Ignorabimus" we do not and we will never know – and therefore we should skip the related research activities to save our resources for more hopeful questions (Bois-Reymond 1974). Even this was a special ontological position about the observer and the observable. The first world riddle was that we will never know about the nature of energy and matter. Einstein explained that both are principally the same!

But he did not make plausible the nature of the modification of energy for its expression as matter. An additional challenge for the extended view!

Quantum theory and especially quantum electro dynamics are linked with an additional aspect of the relationship between the observer and the observed. The observers – all are technical equipments on the basis of quanta – are influencing the process of the observed – again entities on the basis of quanta. And quantum theories e.g. quantum electro dynamics are able to predict the probability in which way the phenomena will occur e.g. a beam of light is passing a plane of glass. But not only this! Quantum theory can "reproduce" the whole chemistry and physics – without gravitation. But it is a pity: It cannot explain **why** the formulas work so well. Feynman pointed this out: "I do not understand it [Quantum electrodynamics]. Nobody does it. … I can't explain why Nature behaves in this peculiar way. … The theory of quantum electrodynamics describes Nature as absurd from the point of common sense. And it agrees fully with experiment. So I hope you can accept Nature as She is – absurd." (Feynman 2006)

This ontological position is another challenge for the "Extended View". But it is not the aim to explain the nature of the formulas of CE with the Extended View as it is not the aim to extend the knowledge of any other related discipline. The aim is to make plausible e.g. ***why*** *we should not be surprised about such an "absurd" situation, and*

[1] In the language of philosophy the creation of terms would be counted to idealism and constructivism in opposite to the observation of the fact for which the term should stay. This can be counted to realism and empirics. Therefore Einstein links with this position empirics and constructivism as well as idealism and realism.

that this is not in contradiction to the same principles we use to explain why the given world can be handled usually adequately with common sense.

The General Relativity Theory can be understood as a paradigmatic shift too: As an assumption about the nature of the given world in which the equivalence principle is not only valid to deal with heavily and inert mass within a theory which allows to understand them as identical. Einstein postulated this as a general principle: If there are two (or more) "units, which seem to be different according to the actually given theories, but are related empirically to identical results, then there must be a (more general) theory which allows to understand the (former) different as identical from the principles." (Weizsächer 1979) The question about that more basic principle behind the distinct expressions can be seen as the search for the symmetry behind them: Symmetry understood according to e.g. Weyl as that what remains unchanged under modifying conditions. The different steps in the evolutionary process can be understood as the consequences of a break of symmetries and the use of options within the former and the new levels of symmetry.

Symmetry and the equivalence principle should be integrated into the extended view.

Physicists developed different instruments to deal with "that what remains unchanged", e.g. in the observation of the movement of the sun and the earth. Galilee introduced the principle of the classic relativity: He introduced a coordinate grid in which the earth and the sun could be posted and made a transformation of movement on the basis of e.g. the earth to such a point of relation possible. Einstein extended this principle with a grid which integrated the Lorentz-Transformation and the calculus of Poincare to the Special Relativity Theory. Einstein focused on the relevance of symmetry (and sparsimony) for the General Relativity Theory. So we can understand the formulas of the GRT as the application of a much wider valid principle just on physical topics, and the principle of relativity as principle which is valid generally in the given word. Einstein explained this for social relationships as follows: "By an application of the theory of relativity to the taste of readers, today in Germany I am called a German man of science, and in England I am represented as a Swiss Jew. If I come to be represented as a bête noire, the descriptions will be reversed, and I shall become a Swiss Jew for the Germans and a German man of science for the English!" (Einstein A. 1924)

Transformation is the standard technique to adjust modifications of "fundamentally the same" but in variable systems. A prerequisite for each transformation is an adequate grid. It is obvious that the shift between the attributions "a famous or condemned person" with respect to the valuation of "scientific success" and "vogue of nation" cannot be handled adequately with a grid for time and space. As well the grid for time-space as transitions can be seen from the position of an evolutionary point of view: This allows to understand on one hand the fundamentally different but both conclusive positions of Kant (time distinct from space) and Einstein (Timespace). Therefore we have to expect modifications to deal adequate with transition from the extreme old stage to – from the evolutionary point of view – younger ones. Persons, science, nations and especially values respond to very young stages within the evolutionary process. Therefore modifications should not surprise: inanimate entities look different than an

alga and an alga different than a brain cell and the brain cell different than the person. But "values" are in principle to be observed. If we will accept "relativity and transformation" as general principles then e.g. the principle of semantic correctness needs to postulate another type of "grid" as the one needed for geometry.

Therefore we have to postulate the need for an additional type of grid which allows to give information-related aspects a "position" which can be modified. This has to be taken in consideration for the creation of the Extended View. But there must be a fundamental linkage between the grids to be able to bridge different ontological assumptions about the evolutionary process.

There are empirical data available which enforce the postulation that also time and space have to be integrated in this fundamentally different grid: Movement, speed, distance and their variations are not only aspects which can be handled adequately with the instruments of physics and chemistry: Konrad Lorenz got the Nobel prize for his research work about behaviors as an expression of immaterial messages. Physically irrelevant modifications in movement, speed and distance can be linked with totally different information within the inter-individual relationships of animals and humans. The key-sentence of Sechenov (the founder of the modern Russian Physiology) dealt with the immaterial aspects of movement. He could confirm with data and fundamentals of neuronal sciences: All is movement including all types of information! This position was just one reason for the relevance of his work for the development of the Extended View (Kofler 2005).

II.4.1. Some spotlights on open questions about ontology with respect to the Extended View

II.4.1.1. *How fast was movement before the restriction to the speed of the light took place and where did this initial impulse end up?*

A challenge for any comprehensive theory is the ontological dilemma of the actual cosmology.

There are two positions which seem to exclude each other, but both are powerful and indispensible to make phenomena plausible: After Plank time and the occurrence of quanta the speed of the light is accepted as the highest possible speed and as a natural constant. But cosmologists refer to incompatibilities with different (actually given) phenomena if this speed would be the highest acceptable speed even during the (extreme short but relevant for the stability of the universe) period between the Big Bang and the autopoiesis of quanta: Ronald Weinberger and Ayyub Guliyev formulated after an analysis of different positions the circumspective estimation of the – not highest and not slowest reported – speed of the precursors of the quanta: They would be able to move in 1 second about many millions times from now back to the point of Big Bang and retour. This is a distance of about 13 billion lightyears. From this position the speed of light is nearly "neglectable" slow. What are the consequences in respect to the conservational laws, especially the conservational law of the impulse? How can these incompatibilities be respected in the creation of characteristics for most basic actors which allow to make plausible the autopoiesis of quanta?

A challenge for the "Extended view".

II.4.1.2. *Darwin and the unanswered question about the origin of life and mind from inanimate precursors*

A fundamental shift of the scientific worldview is linked with Darwin's theory of evolution of living beings. This theory replaced the former religion-based Cartesian world view with two in principle different substances (res cogitans and res extensa including vis vitalis). But the relevance of Descartes for the self-understanding of Western sciences is important up to now (Kofler 2013). The theory of Darwin did not integrate teleology in the historic sense of Aristotle and therefore God as final reason. He integrated also four causes including *causa finalis* – but with a different understanding which was called later so called "teleonomy": The individual entities use their individually available resources with the aim to survive as an individual. This had the unintended consequence of the "survival of the fittest". But Darwin attributed to the process also the intention of the preservation of the species. The "survival of the fittest" was formulated first by the sociologist H. Spencer, the father of social Darwinism. Darwin explained the morphological and immaterial evolution with the same principles. But the evolutionists of the 20th century focused nearly exclusively on morphological characteristics – based on genetics, today also on epigenetics and proteomics. K. Lorenz re-discovered the relevance of evolution as a knowledge gaining process and the related philosophical aspects. Lorenz, a follower on the chair of Kant in Königsberg, was one of the founder of the so called "Evolutionary Knowledge Theory". But neither Lorenz nor the representatives of his philosophical position/school nor Darwin himself have given an answer neither to the origin of the mental power of the most basic animals nor to the origin of life from inanimate entities. Darwin (1871) classed these two questions as totally hopeless.

Again challenges for a comprehensive theory which has the aim to cover all health related disciplines as subsets within a new ground set without accepting the introduction of other terms beneath the ones which give name to conclusive autopoietic evolutionary wins.

II.4.2. The technique of Einstein for a theory of principle: developed to unify axioms of Newton's mechanics and axioms of the electromagnetism of Maxwell

The starting points are on one side a system of axioms/principles which allows deducing logically propositions as laid down in the books as actual state of knowledge. On the other side we have the sense-experiences of special cases which can be predicted or can be made plausible by the use of the related propositions. The connection between the axioms/concepts and the propositions among themselves and each other are of a logical nature. The connection between the self-experiences and the axioms/concepts only seems to be of logical nature but this is not true: The logic connections are caused just by a psychological impression. This is evident if you think over in which way an additional axiom is integrated into the system of axioms. Such a step must have taken place with any systemic axiom in the history of science before the related axiom became part of the state of knowledge. In the beginning there is just the intuitive assumption that the axiom could be adequate. This principle difference in the nature of the relationship

between the totality of sense-experiences and the system of axioms (intuitive) and between the axioms and the proposition including their application for the prediction of the result of an experiment (logic) is obvious too in the case that different propositions which are state of knowledge are not logically to be linked but the scientist is willing to make them compatible.

This was the case with propositions on the basis of Newton's mechanics and propositions on the basis of Maxwell's electromagnetism: "There is no logic way from the sense-experiences to the needed additional principle." This (primarily speculated) connection between the sense-experiences and the additional principle "is purely intuitive". This invention of the human mind is in principle entirely arbitrary. Therefore it is acceptable only within the frame of the prerequisites of the other propositions and their power to predict further on the related sense-experiences. So the invention itself is not enough: The used terms and the related contents must be adjusted again and again (by inventions) up to the point where all former possible predictions can be made further on, but additional ones too because of the additional principle which is "behind" all the used propositions – with the effect that now all propositions are logically and semantically correct. The semantic correctness deals with the identical meaning of the same term in any principle and proposition. Its demand is the consequence of the modification of the content vs. the meaning of the used terms. This argumentation makes clear: There is no logic way from the sense-experiences to the axioms of a theory, but the theory can be – and has to be – proved logically by the experiment. Therefore "nothing is as practical as a good theory" and "The theory defines what we can observe and in which way we have to interpret the results." (Einstein 1952)

This technique can be used not only to integrate an additional principle
to unify different propositions which are part of the state of knowledge.
It can be used to create a system of principles which allows unifying scientific disciplines which are part of the state of knowledge, if there are principles which are accepted within all the scientific disciplines which are to be unified.
I call such theories "real theories" –
to distinct them from the term "principle theories".

It is not easy to find out the differences in the contents in which identical terms are used in different propositions and axioms. We made good experiences with a technique which was developed by Wallner for the model of constructive realism: He named it "alienation": To apply a term so consequently up to the point that nonsense occurs. Then modify this term so that the nonsense disappears (Kofler & Puritscher 1993).

III. PHILOSOPHERS AND SCIENTISTS USING PHILOSOPHIC TOOLS FOR APPLIED ASPECTS

III.1. There is no science without a world view

Any scientist working on an applied problem of our "given world" should remember that even the decision to do such a research implicates ontological and epistemological consequences. One is that he assumes that the world outside of him

really exists[1]: This is a decision which would not be accepted by a solipsist – a person accepting pure idealism only. Solipsists deny the any physical existence and insist incontrovertibly that all your feelings etc. are just your own creations. Any natural and human scientist has to accept therefore a form of realism. In the end you need to choose between these basic ontological positions before you even started.

And your decision to do research is an implicit statement about the nature of your research object: that it makes sense to use scientific tools. A pure skeptic would disagree – again inconvertibly. Finally both prerequisites are plausible but social agreements which we all accept since thousands of years – and with good output.

There are other agreements accepted especially within natural scientific communities which are much younger, with good output too, but without logic and scientific fundament: e.g. the decision not to ask **why** anything in nature takes place. For many scientists it is enough to be able to describe conditions which are to observe. They understand this as sufficient explanation. But such an ongoing contradicts with the daily life of an applied scientist: A patient, a client, or the representative of the government is asking why anything takes place or will take place or **why** he should spend money for an intervention, should accept pain etc. Therefore the classic argumentation which was introduced by Aristotle with his four causes is more than newsworthy today.[2] We have to integrate "*causa finalis*" as it is common in many humanities and psychosocial disciplines including ethology.

But the assumption what can be a final cause
must be seen from an evolutionary point of view:
The intentions we can attribute to lower animals
cannot be identical with the final goals of a human person.
Another challenge for the "Extended view" is the fact that physics, chemistry
and also basic physiology can be handled so effective
without the integration of a causa finalis.
This needs a sufficient explanation too.

III.2. Problem-oriented selection between ontologies and epistemological techniques

Medical doctors and other applied scientists are used to borough techniques from other scientific disciplines. This is done problem oriented: If a more appropriate physical technique is available, then they replace the chemical or biochemical one. For them it is not the key point to expand the state of knowledge of physics or chemistry but to serve better for health or sustainability. For the expert in physics or chemistry the progress of science in his field is the focus of interest (and also the personal carrier

[1] The sum of the things, their processes including our knowledge and the consequences of its use in biological cultural and social surroundings we can name "the given world". Therefore this term can be used often as a synonymous for the environments

[2] The number "four" is a holy number of the Pythagoreans. Maybe therefore Aristotle covered different subgroups into his "four causes".

including economic prosperity, see Th. Kuhn: The structure of scientific revolution[1]). Therefore it is to understand that users will and should select problem oriented even between philosophical offers. But this has to be done in a scientific correct way: Therefore we have to use the offers with the clarification that the use of the problem oriented most adequate is a simplification and not a statement, that this e.g. ontological position is the only possible: So it is sufficient to deal with a worldview which seems to be consistent with the assumption that the earth is a disc: If your problem is to evaluate the work of a mason you will use a water scale. Its assumption is that there are parallel lines and the wall should be parallel to the surface. We know: There are no real parallel lines. But for our problem it is sufficient to work with this solution.

Similar is the situation of a scientist working with the influences on the exchange rate between Dollar and Euro: It is sufficient to neglect materialistic aspects, e.g. the different qualities of paper. You can attribute to him an idealistic substance monism. And a physicist can neglect immaterial aspects if he calculates the trajectory of a missile. This can be seen as the expression of a materialistic substance monism. But there is no need for such a statement: neither for the physicist nor for the economist: But if they would reclaim a materialistic or idealistic substance monistic paradigm then they would create incompatibilities because of world explanations which would exclude each other. Both positions are compatible if both accept a neutral substance monism – as will be pointed out later. But both can claim the need to simplify their tools as simple as possible with respect to the given problem, but not simpler (Einstein).

The extended view should allow shifting problem
oriented between ontological positions.
The model should allow understanding
why simplifications are needed
and deduce parsimony as a system immanent principle.

The same argument can be used for the decision about the most **appropriate epistemological technique**. The recommendations of Popper are very common and often helpful, but not the only ones. Helpful offers are presented – and used within the frame of the "Extended View" – by Lakatos, Bacon, Galilee, Descartes, Kuhn, Feyerabend, Wallner etc, offers based on dualistic logics but with dialectic techniques, fuzzy logics etc., by epidemiology, heuristics etc. The user can/will select from the treasure of philosophy according to his problem. Often he has to combine or modify them for a most effective output. The user is applying – not a creator of a new state of knowledge in philosophy. The techniques which were developed by Einstein to unify the theories of Newton and the theories of Maxwell are of special interest if the problem is to unify health and sustainability related disciplines.

[1] We can explain the difference comparing philosophers with different experts polishing the facets of a giant brilliant: Each one is focused just on one facet and interested to distinct "his facet" – his philosophical position – as exactly as possible from all other facts. The user needs the whole brilliant. Depending on the incidence of light a special surface is the most sparkling, but just because of the complex cutting.

III.3. The relationship between theory and practice

The relationship between theory and practice can be expressed with the famous sentence of Einstein (1920): "As far as the laws of mathematics refer to reality, they are not certain; and as far as they are certain, they do not refer to reality" (Einstein 1920). Maybe the theoretical philosophical offers are in a similar relationship to their application in practice: The philosophical models to deal appropriately and scientifically with our given world are handled often in a way as if the models would be ideal. But the natural process and the work of scientists are not ideal. Because of the latter we have to expect deviations from the predicted results e.g. by experimental proving. One consequence of the philosophical position of ideal connections is that a chain of argumentation should not be used further on if the conclusions bring you back to the starting point (circulus vitiosus, regress ad infinitum). But the experience of applied scientists doing the same with their data is different: It is a fruitful technique to think over again and again identical terms and their interrelationship, even this process is going again and again in a circle. Einstein recommends such thinking about possible connections in a circle for theories in principle. And the possibilities to use the flexibility of principally identical follow-ups within circles is a powerful instrument within biology: E.g. the citric acid cycle consists on a permanent follow up of the same chemical structures for problem oriented metabolism.

The basic assumptions within the Extended View have to respect
that aims and goals might be ideal,
but its transfer into practice is not.

III.4. Implicit and explicit restrictions and the relevance of self-oriented, and consent-oriented aims within the frames of the given world (environments)

All scientists – but any other person too – are implicitly restricted by what they "have seen before them from infancy" (Einstein 1949), what they have learned in childhood and in their early experiences as young scientists. Often this is accepted as "evident" and not worth to think over. In addition the aim to remain or to reach membership within selected communities and societies and therefore the relevance of inter (and intra-) role conflicts should not be underestimated: The intention to be **in consent** has often more relevance than the logically correct conclusion about consequences of e.g. falsified assumptions: You can see the paradigmatic statement of Einstein when he responded to the empirical fact of incompatibilities concerning phenomena of particles and quanta and the – philosophically correct – option to attribute to them a potential, aimed at the spontaneous decision to change their position and direction. He would prefer "to be a shoe maker or a worker in a casino than to be a physicist before having to take such an idea even in consideration". Exactly this proposal was made by Heisenberg and interpreted as a fundamental shift in the paradigmatic position in physics (Einstein 1949). This unconscious pressure allows us to understand the influence of religion on sciences, e.g. heaven as outer sphere in the cosmic model of Aristotle, the acceptance of the exclusiveness of priests doing research up to the end of the 19th century in the Christian countries, or nowadays the self-restriction on "causae materialis and efficiens" just because of a social convention –

even though there are obviously different types of causes existing.

But (physical, biological and social) **environmental aspects** restrict science too. These restrictions result not only from the available empirical techniques, the options to travel, but also from the given state of knowledge. What would Aristotle have been able to formulate, if he would have been on the "Beagle", or Kant and Darwin with the knowledge of today about genetics, epigenetics and proteomics, or Galileo with a stopwatch?

Often scientific arguments are used to hide **self-oriented intentions** – as Th. Kuhn could clarify as the most restricting factor for paradigmatic progress in his "Structure of Scientific Revolution".

The basic assumptions have to give respect to the fact
that there is a need to balance self-orientation,
consent-orientation and environment-orientation.

III.5. The need for logics using reciprocal weighting of incommensurable qualities additional to the two-value logics

It is obvious: The decision to select between these different aims which have to be balanced adequately and the decision of the intensity of the action cannot be done in consequence of logic thinking, but neither with two-value logics: We need "*a kind of reciprocal weighing of incommensurable qualities.* (Einstein 1949)". The Aristotelian logic is helpful for the decision: Should the constructed decision be realized or not.

This must be respected within the Extended View.

Explicit and obvious **relationships between philosophy and science** in the general and applied sciences are characterized by a permanent change: The term "philosophy" covered all scientific approaches we call now "human and natural sciences", when Aristotle invented the different scientific disciplines on the basis of his philosophical theories. The actual philosophical sub-disciplines "ontology" and "epistemology" were called "metaphysics". The concept of Aristotle focused on the integration of theory and its application with respect to the ethical, social, economic and political implications within an universal world in which all is linked – with more or less relevance – with everything. And he is more interested to explain what in nature can be seen as subunit of a whole than to focus on distinctions between them. This is a very relevant but underestimated aspect in the actual scientific situation (Northrop 1958). The aim of Aristotle to act comprehensive and scientifically and ethically correct can be seen as a precursor of the actual urgently needed intention to unify all related scientific disciplines as a fundament to guide individual and social activities for a health and sustainable oriented future[1]. Aristotle integrated all natural processes – according to the socio-cultural prepositions of his time – as an expression of a transcendental teleology. The latter position does not seem to be compatible with the modern self-understanding of human and natural sciences. They have the aim to try to explain the processes of our "given world" without a permanent influence from outside of the

[1] Therefore the initiative of the Biocosmological Association is relevant to re-discover the offers of Aristotelian thinking adapted to the needs of the 21st century.

universe and without intelligent design. Nevertheless: It is generally accepted that any science is based on assumptions and we cannot explain their origin e.g. by the scientific discipline which is based on it.

Not only the content of the terms "philosophy" and "metaphysics" changed within time: The relevance of "philosophy" as prerequisite and tool for sciences and their application is in a permanent change: Scientists and users of science e.g. in medical faculties of the western world were well trained in philosophical tasks up to the beginning of the 20th century. They understood philosophy as indispensible for their work. But – maybe as an unconscious reaction to the restricting fight between Christian Churches and science – a relevant branch within the scientific communities (Positivism) opposed the influence of (school-) philosophy. They focused on the aim to exclude everything from science that cannot be (directly) observed, including all related "causes", especially *causa finalis*. This position allowed – as many other philosophical views – remarkable progress. But e.g. Einstein pointed out that for example the epistemological instruments of the positivist Mach allow relevant progress. But the philosophical position of Mach *in toto* was "essentially untenable" for Einstein (1949) – because of Mach's ontological axiom to exclude any constructive and speculative nature of thinking from science.

Actually scientists in general and applied scientists specifically assume often that they do not need philosophy. Maybe they are right if they mean "school-philosophy". But it is impossible to handle even daily life without a world view ("paradigm"), not only in science. "A world-view" is "ontology". Therefore any scientist has only the choice to use philosophy unconsciously or consciously. In the latter he can select between philosophical offers and can deal with their system immanent powers and restrictions. You can understand this choice as a "must". A decision for a paradigm and adequate rules for its transfer into daily (or scientific) life, as a natural expression of the need to simplify the general to be able to focus on details. Ontology marks the frame for techniques which should be as adequate to deal with a given special problem as possible. This implicates also epistemological techniques. A choice between offers is only possible if you know about them. Medicine and sustainability should focus on offering the best available answers. Therefore the question "should I deal with philosophical offers or not" has an ethical aspect too.

IV. IN PLACE OF THE CONCLUSION (PART 2) – PREREQUISITES FOR THE "EXTENDED VIEW" IN CONSEQUENCE OF THE ARGUMENTATION OF PART 1

IV.1. *List of aims*

- No lost of power for health and sustainability
- Scientifically: by definition no influences from outside of the cosmos for the explanation of the deduced statements
- causality as intention; "Four causes" as necessary and sufficient aetiology

IV.1. ***List of open questions***

- A sufficient explanation of "evolution", the autopoiesis of life and mind from inanimate entities, of matter in time and space, of "absurd" powerful views within plausible world
- Avoid ontological dilemmas e.g. of the maximal speed which is accepted during the actually accepted whole cosmological processes including the conservational laws
- Why are physics, chemistry, biochemistry and basic life sciences including physiology so effective without accepting *causa finalis*?

IV.2. ***List of axiomatic principles***

- From quanta to "quanta"
- A grid for meanings and its relation to the "Euclid" – analogy of grids
- Equivalence
- Symmetry
- Semantic correctness
- Uncertainty of effects (realization, construction)
- Parsimony
- Comprehensive simplicity: in consequence of parsimony and semantic correctness
- Discovery vs. invention
  - The invention of the ability for construction
- Triadic related to balance self-orientation, consent-orientation and environment-orientation.
- "Ladder of nature" – by Bezug zu Riedl, N. Hartmann, Aristotle
- ONE evolutionary process

IV.3. ***List of (further) epistemological tools***

- Additional hypotheses with falsification, etc., according to Popper, etc., for topics without the need of a modification in semantics
- Modified technique according to Einstein for topics which need a modification of semantics or/with additional principles, supported by "alienation"
- Traditional use of mathematics where it is adequate

IV.4. ***The used ontological and epistemological position and their interaction***

- Problem oriented approach, the interface between the ontologies:
  - Neutral evolution based (substance) monism
  - A constructive hypothetic realistic position; and relation to empiricism and mathematics
  - Set theory as interface
  - Metatheory construction in the cases when scientific disciplines should be unified
  - Aristotelian philosophical system
  - Adequate tools for proving the helpfulness of the theory

IV.5. ***The transfer to the (ontological) invention of the MBA (Mechanoeitons)***

- The characteristics of MBA invention on the basis of heuristics
  - Not ideal: the potential cannot be won or lost, but modifiable
  - Potential for energetic and information related efficiency
  - If "substance" – then substance-monism with complementarity
- Deduction of most basic principles

IV.6. ***Transfer into application with the aim of a comprehensive model for additional offers for health and sustainability***

- General Extended View (GEV)
- Special Extended View (SEV)
- Applied Extended View (AEV)
- Complex Extended Social Medicine (CES)
- Extended View for Public Health (PHEV)

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