

# INTERDISCIPLINARY META-LEVEL UNIFICATION SCHEME-INTERPRETATIONISM AND SOME PROBLEMS OF SYSTEMS, MODELS AND INSTRUMENTAL HERMENEUTICS

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## ARTICLE INFO

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## ABSTRACT

Overall, the current real and the scientifically represented world is much more than hitherto characterized by problems of cross-disciplinary or “inter-areal” connections of diverse topical research fields within complex and highly interconnected real, model, and quasi artificial systems. Here, we will address the respected problem of the humanities and social sciences somewhat by the rather old-fashioned contrast to the natural sciences. In the main part, I shall sketch my own approach that I call (scheme-) interpretations or methodological interpretative constructivism. This methodological concept seems to me to make possible a bridge between the disciplines – at least by going higher level in one’s methodology. The next part will turn to the historical and methodological questions of text-interpretations or methodological hermeneutics thus amounting to a prominent special case of the scheme-interpretations approach. Finally, the last part draws some methodological conclusions regarding an abstract interpretations “reunification” between the different scientific disciplines and everyday understanding.

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## KEYWORDS:

**Cross-disciplinary; scheme-interpretations; scientific disciplines; quasi artificial systems;**

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## INTRODUCTION

### Take-off from the “Two Cultures” Split

The traditional, rather sharp separation between and by disciplines is not anymore to be upheld, if not just for operative, methodological or methodical reasons. This certainly leads to respective challenges on the side of scientific methodologists on the one hand, but also of social scientists, social philosophers, and moral philosophers on the other. We all know the problems resulting from the handling of documentation systems, the irretrievability of data, the almost unlimited possibility of combining data with respect to data protection problems, respective legislations etc. Some even fear that we are on the brink of or already living in a “computerocracy” – being the fate and development of mass societies which cannot be stopped anymore or scarcely be legally checked. This is certainly true since the last one and a half decades with respect to the world-wide information systems like the Internet, World Wide Web, and other means of data retrieval and access leading to hardly solvable questions of moral responsibility for the data stored or manipulated which cannot be allocated or assigned to a respective one and only bearer of the responsibility anymore. It seems that human responsibility for consequences and developments in comprehensively interconnected and complex information systems can neither ethically nor legally be borne by an individual person any longer nor by a rather vague and almost unlimited set of agents whether individual or group-sized. These questions are at the moment beyond any possible idea of a solution, how an operational (izable), practically applicable, ethics or legislation and executive jurisprudence regarding the worldwide information systems will look like.

To say the least, it cannot be the case that the problem areas and disciplines in these overriding fields of worldwide interconnections can be neatly separated from each other. Many most important problems of our society as well as life in general do not encounter in a pigeonhole-like separation

of individual disciplines. In addition, disciplines cannot be operated rather independently of one another, but they all have to accept the interdisciplinary challenge generally outlined. This is also and all the more true for the disciplines called the humanities. The interconnections of systems in our systems-technological age require the application and development of abstract procedures and generalisations as, but not only, by formal and functional perspectives of representation. Across disciplinary description and processing as well as practical action portfolios in handling objects, processes, systems and the respective interconnections between them this operational approach is growing ever more important. This can be called “interdisciplinary” in a true sense. It is now a necessity to go “interdisciplinary” and supra-disciplinary if not even multidisciplinary. This can only be addressed in a rather general form by going methodological, formal, and informational at the same time. This means that also a practice-oriented and reality-prone methodology has to be developed, i.e., an epistemology which can take up these requirements and the interdisciplinary constitution and interconnection of the problem areas in order to consider all these phenomena in due proportional balance.

To be sure, tendencies of a sort of quasi autonomy or independence of systems operations and systems are notably being in danger of developing a systems technocracy or “computer cracy”, which can only be counter-balanced by a cross-disciplinary delimitation, control and safety regulation as well as risk-minimization reaching beyond any single-disciplinary one-sidedness. Therefore, we need beyond the extant teamwork of different specialists and experts from different disciplinary schools and approaches also so-called generalists developing and applying abstract methodologies, methodical and operational approaches which can be used in rather different areas. This is even true also for the so-called “specialists for the universal”, i.e., the “universalists” approaching the problems of societal aims and social values

as well as the methodological and epistemological basics and interrelationships of the respective disciplines.

Such interdisciplinary interconnection problems are confronted in the intersection area of many classical disciplines. These topics are only to be addressed across and beyond the single disciplines. There is indeed a necessity to develop interdisciplinary and supra-disciplinary approaches – in practice and also in theory – i.e. from a higher level methodological perspective. Classical mono-disciplines are as a rule overcharged by the post-disciplinary phenomena, processes and problems of an inter-areal type. The multiplicity of disciplinary perspectives and the incompatibility of many judgements by the experts from a single disciplinary perspective would typically lead towards important organisational and methodological problems going beyond the pigeonhole separation of the respective disciplines. This is especially true for the traditional humanities with their once fashionable distinction between the alleged “two cultures” of the “natural” versus the “Geisteswissenschaften”, or historical disciplines (Snow 1959, 1967).

**In what follows I am going to forward some rather** methodological remarks regarding the development of the so-called humanities and historical sciences – in difference, but not by contrast, to the natural sciences. During the 19<sup>th</sup> century there seemed to have opened up a sometimes so-called “grand” cleavage between the humanities understanding themselves as “the understanding disciplines” (“verstehende Wissenschaften”) that provocatively thought themselves in a certain kind of contrast to the so-called “explanatory sciences” dealing with law explanation and a covering-law (DN = deductive nomological) model comprehensively applied in the theoretical and systematic natural sciences. However, to be sure, there are also descriptive natural and historical disciplines like traditional descriptive botany etc. or biology and geography, but these

are by now largely under the grip of the covering-law sciences.

Generally speaking, the methods and methodologies of the covering-law sciences were said to be totally different from those of the humanities. For instance, people – and primarily scientists – said that the humanities and the ‘humanists’ (“Geisteswissenschaftler”) would only “understand” (“verstehen”), but not “explain” (“erklären”) something. By contrast, the natural scientists would really strictly “explain” – but not at all “understand” the phenomena, as a few representatives of *humanities would somehow* ironically judge. Already this rather ironic opposition reveals that this dichotomy, beyond a first plausibility, cannot be right in the last analysis.

A widely held “separatism” of the disciplines and methods culminated in this contrasting of “Verstehen” and “Erklären” and even led to a critical contrast rendering the so-called *two-culture* separation and a respective thesis after C.P. Snow (1959). This *two-culture* separation was enthusiastically hailed by the hardcore ideologues of both sides, although Snow originally did not contrast the “natural sciences” and the “humanities-bound” culture, but rather the “(natural) scientific” and the “literary intelligence” – which is a different contrast indeed, however not a contradistinction of the kinds of sciences. This was notably overlooked in the debate. Indeed, it became current opinion that the intellectuals and especially the educated ones in literature would be hostile against the natural sciences. They were considered somehow a kind of reborn “machine stormers”. Inversely, these again would hold the natural scientists to a certain extent as “cultural barbars”. The question of a border-crossing was according to Lord Snow, e.g. regarding the knowledge of the Second Principle of thermodynamics, by some representatives of the humanities and literature rather coolly received and answered with disrespect – whereas on the side occasionally natural scientists were asked the rather provocative question whether and

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how much they had read Shakespeare.

Indeed, these traditional dichotomies were often repeated and modified but such widely disseminated past contrasts and limitations have become much more flexible and dynamic during the last half century in the course of the mentioned developments and overriding and cross-disciplinary perspectives. To say the least, these separations were and are indeed by far too rough. Mostly, already because they accentuated this contrast from the beginning.

But this so-called dichotomy indeed did not fit well even in the past. Mathematics being to be sure a “pure” “Geisteswissenschaft”. Logics did not fit into this “dichotomy” either. Furthermore, linguistics and the social sciences are neither natural sciences nor “pure” Geisteswissenschaften. A notorious example is certainly psychology located between the different branches of a naturalistic, experimental or *behaviourist* branch on the one side and “humanistic” (traditionally person-oriented) one on the other hand. (There is even an ideological split and strife between strictly experimental psychologies and the explicitly so-called “humanistic”, or hermeneutic psychology.)

Many an author tried to establish social sciences as a third (or even fourth or fifth) “scientific culture” in the sense – like Lepenies and Zimmerli. True, also in the past there were always mixed discipline, special cases, and *phenomena* in between the psychological branches leading to difficulties for the universal polarity. In particular, there are and were also in the humanities special formal disciplines as, e.g., logics (even symbolic or *mathematical logic* in the narrower sense is surely a “Geisteswissenschaft”) or formal and theoretical linguistics or, again, sub-disciplines like mathematical psychology and mathematical sociology. Conversely, also in the natural sciences we have of course historical disciplines like palaeontology, cosmology, classificatory biology etc.

In summary, the methodological separatism between

“explanation” and “understanding” in the sense of disparate and separable if not even incompatible or not combinable procedures of different science cultures is obviously false, outmoded and ideological, a distortion or misrepresentation leading to a caricature of the relationship between the different sciences and disciplines. The traditional “either-or” has to be replaced by a proportional “as well as” in a more differentiated and well analyzed relationship between the two or three or four kinds of disciplines. Separatism leads to a sort of dogmatism, and any dogmatism whatever is an end of analysis with regard to the most interesting questions addressing the urgently required interdisciplinary “diplomatic relations”. Therefore, we should defy separatist dogmatism.

It is true, however, that provocative and even polemical formulations may sometimes lead to a further development: for instance, neo-positivism has certainly contributed to the quality and philosophy of science in an important sense meeting the requirements being heuristically and motivationally very fruitful for the development in the first half of the last century. But these stances remain sterile, when a dogmatic hardening by some representatives on both sides and the unfruitful self-limitation or self-restraint with its thinking within fences and blinders. It is much better in the sciences and in the surrounding disciplines even in everyday knowledge to proportionately acknowledge elements and moments of both methodological traditions and to develop the rather fruitful interconnections and mutual relationships, even the cross-disciplinary aspects and the crossing of dogmatic limits.

A very important differentiation is necessary in between the fashionable but usually rather dogmatized polarity between patterns of strict explanation and other systematizing or theoretically generalizing theories on the one side as against rather descriptive historical approaches of the so-called “understanding” (“*verstehende*”) disciplines on the other. As was mentioned already there should not remain a

confrontation of contrasting these approaches in a total and exclusive sense but rather a differentiating combination and approach of dealing an co-operating with both of them, as respective research areas may require - like, e.g., the descriptive disciplines like paleo-anthropology, descriptive geography on the one side or, on the other hand, linguistic theories as, e.g., semi-lattices in the formal theories of linguistics and mathematical language analysis.

Another rather important distinction seems to be the one between cognitive and normative disciplines. Cognitive descriptive approaches are certainly largely the dominating ones in the natural sciences proper, whereas, e.g., jurisprudence has to be largely taken as a normative discipline, although there are descriptive and cognitive parts and derivations as well as knowledge perspectives that are also important here leading to what can be called nowadays a supplementation of jurisprudence by some modern sciences like sociology, neuroscience and, traditionally, psychology and even criminology as auxiliary disciplines.

A further rather important difference seems also to be the distinction between real and material objects vs. fictional or soci (et) al objects which are by definition produced by human ruling or linguistic or language structuring and categorizing of a social provenance. (See below).

Just simple cooperation of projects in interdisciplinary research co-operations are certainly the practically most important sort of interdisciplinary teamwork by experts of different orientations - like for instance in city planning or any environmental research dealing with natural and human-made and manipulated systems. This is, however, a rather loose not systematic or systematically or theoretically interconnected cooperation or aggregation of experts' work and contributions according to the respective planning or development programme.

There are bi-disciplinary aggregations or cooperative networks within a research project obtaining between two disciplines, e.g. between architecture and sociology in city-

planning. More generally, a respective multi-disciplinary cooperation of projects within a whole field, as in environmental research which seems to have become by now a kind of “gathering” discipline between different input disciplines. (This might be a bordering case of what Weingart called “multi-disciplinary aggregate science” (his example is science of science). –

From such an aggregative co-operation there certainly a genuine specific *interdisciplinary* has to be distinguished - as, e.g., molecular biology or biochemistry or, more traditionally, physical chemistry.

There are they the so-called “systems theories” in sociology, for instance that by T. Parsons and that by N. Luhmann.

In addition, there are nowadays most prominently also generalized interdisciplinary research fields of a formal or model-based character as for instance generalized systems approaches like the “General Systems Theory” in engineering (after Bertalanffy) or recently and importantly mathematical “General Dynamical Systems theory” to be applied (see, e. g. van Gelder 1997, 1998).

Purely formal and abstract mathematical theories of, e.g., complex dynamic systems nowadays, are notably involved in progressive developments in dealing with systems of deterministic chaos or fractal geometry within these approaches. Supra-disciplinary applied structural and operations disciplines as are to be found in economics in the form of the so-called Operations Research are relatively old. However, there are also new ones like network theories (Castell) and (up to now primarily deterministic) chaos theory as long as no probabilistic chaos is worked out. (That latter one seems to be a real desideratum!)

Moreover, there are methodological-meta-theoretical supra-disciplines of a higher level like traditional philosophy of science or also a higher-level approach to science research (“Wissenschaftsforschung”) on a more conceptual basis.

Finally we have to mention and probably also develop the philosophical and methodological meta-theoretical field of

debates of the respective systems connections and the whole set of the disciplines and charge under a specific holistic or higher level-methodological perspective as for instance offered by methodological *interpretations* or scheme-constructionism to be outlined below (see already my 1978, 1993, 1995 + a, in English 2000, 2003, 2007).

Indeed, these different aspects and possibilities of *interdisciplinary* are useful, because, e.g., pure “gathering disciplines” loosely covering a practical field of research in a complex interaction of different scientific approaches just bound together by practical requirements are quite another thing than an exact *interdisciplinary* like physical chemistry or again, as a mathematical operative theory, e.g. in economics and decision theory, mathematical game theory.

Everywhere here, we have to take into consideration clear methodological distinctions and differentiations. For all these aspects, we have to require that the scientists involved have to have for this a certain kind of secondary competence in the neighbouring respective science or discipline. Lastly, it is obvious that the philosopher of science who wants to systematically deal with methodical and methodological problems of biology should be somehow up to date in biology proper. He or she need not be a productive researcher in biology, but should be able to evaluate the present state of the art. Secondary competence would also be required then for study programs in philosophy of science and notably in doctoral programs. Such an education of plural or many-sided competences would mean to delve into different or diverse sciences involved; that however is possible for an individual only in a limited measure. Again, the development of the more general systems competences as mentioned – especially of those abstract and formal methods of the “generalists” and even the capabilities of the “universalists” beyond these specific disciplinary orientations – are necessary conditions for being able to do research, analyse and discuss overriding problems of values

and norm systems etc.<sup>1</sup> The relatively best solution conceivable is of course not the one springing from the “encyclopedic” brain of the “universalists”, but mostly a cooperative production and cooperation within and by teamwork of scientists from different provenances.

It seems necessary to draw some short theoretical consequences from the sketched problem situation. I would like to do this by critically reviewing the implications for the social and the human sciences under the perspective regarding the traditional separatism of methods between natural sciences and humanities and our social sciences. I mentioned already that Snow did not mean the human “science-culture” but as mentioned he talked about a “culture of literature” and a respective mentality of the intellectuals versus the “culture of the natural scientists”. He did not in fact criticise the contradistinction or contrast between kinds of sciences, but a contrast between more general activities of intellectual provenance or orientation. This is another contrast which is not incompatible with an overriding methodological viewpoint, say, from a higher level meta-theoretical approach of methodological provenance which might be relevant of most of the sciences and their theoretical schematisations as well as on this abstract level also for some systematisations as they are also to be found in the social sciences and even in the humanities of historical categorizations. Indeed, the traditional dichotomies are not only misunderstood but also too rough and superficial to be possibly refined to give an adequate image of what goes on in the different landscapes of scientific disciplines and their interdisciplinary relationships.

The general perspective of a constructive theory of scheme interpretations and scheme activations and scheme constructions to be sketched in the following passage seems

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<sup>1</sup> Lately, Martha Nussbaum convincingly epitomized the necessity and importance of all this and primarily for the humanities per se (2010).

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to be a way out which promises to be conducive to gaining a certain kind of overriding if methodological and rather abstract unity within a problem field of interdisciplinary perspectives and approaches. Outlining a methodological schema- and meta-scheme-*interpretations*.

Our ways of cognition, perception and action are necessarily shaped by schemes, patterns and processes of structuring - and, notably, the (re)activation of "schemata". Any interpretation is (instantiated by processes of) scheme-(re)activation. Schemata are epistemologically speaking "structural" activation patterns that can be, psychologically and neurologically speaking, accommodated, adapted, "learned" by (co- and re)activating neuronal assemblies.

Indeed, in our cognition of any kind we are obliged to use frames, forms, patterns, shapes and constructs, models etc. - as well as schemata or schemes. This is true for all sorts of grasping something, may this be by a process of recognition and categorization or of normative structuring or planned acting. Applications of forms and frames are schematizations or scheme-interpretations as I would like to call these interpre(ta)tive constructs and their activation in order to distinguish them from the usual text interpretation in the hermeneutical sense. Schemata might be used consciously or activated subconsciously. Any kind of interpretation whatsoever is connected with or bound to an activation of such schemes. This connection might be characterized by core features and core stimuli the selection of which is necessary, even though some of these are conducted and activated subconsciously. Even here, on the subconscious level, cognitive quasi-constructs are used to render the profiles of contrast and the structural differentiation by activating the functions of the respective sense organs or their processing units of perception and cognition in the brain as well as the integrating poly-modal and combining yet hypothetical centres. They are partly due to hereditary and evolutionary development, partly developed by early ontogenetic interaction with the world,

partly learned by experience and instruction. Others are clearly consciously planned and constructed.

Generally speaking, I call these abstract constructs of frame character "schemata" or "schemes". Schemata are developed and applied on different representational levels in order to integrate individual experiences, single activities and sense data or stimulations into a more general frame, pattern or similarity. Any recognizing and generalising, particular conceptual knowledge is thus bound to cognitive schemes that can be understood as more or less abstract constructs which are projected onto and into the seemingly direct sense perception and the respective experiences by recognizing "Gestalten" (shapes etc.) or constituting objects, processes, events etc. Again, any seeing and recognizing shapes and forms is dependent on and guided by schemata. Any cognition whatsoever is thus schematic. This is true not only for recognition, but also for actions, i.e., not only for rather passive sorts of "grasping", but also for rather active kinds.

It was Kant who developed in his Critique of Pure Reason (CPR) the concept of schema for epistemology by conducting within quasi operational procedures of instantiating as well as developing schemata a connection between sense reception on one hand and conceptual recognition on the other. Kant defined (CPR, 179f, my translation) a schema as "product of the power of imagination (Einbildungskraft), that is not attending to individual images or imaginations, but towards the 'unity' of sensations and intuitions (Anschauungen) and the determination of sensuality", "which is rather the imagination of a method to imagine according to a certain concept in an image than the image itself": "Now, this imagination (Vorstellung) of a general procedure of the power of imagination to render an image for a concept, I call the schema connected with this concept".

Kant related the concept of schema as a concept of such an operation of the sensual and conceptual shaping and framing not just to sense perception like the sensing and seeing of

figures in visual space, but also to the imaginative substantiation of the "pure concepts of reason" (categories). The respective abstract - "transcendental" - schema is "but the pure synthesis, according to a rule of the unity following concepts in general ..." (category) (ibid., p. 181). "In fact, at the foundation of our pure sensual concepts there are not pictures of the objects, but schemata" (ibid.). He termed the procedure, to render to the categories their "image" or mental image, a "transcendental schema" and calls the respective mechanism of coordination "transcendental schematism".

However, Kant applied this procedure of coordination and therefore also the concept of schema also to "imaginative" and mental representation of any objects of experience whatsoever, i.e. of their images: "The image is a product of the empirical capacity of the productive power of imagination, the schema of sensual concepts (being of the figures in space) is a product and so to say a monogram of the pure power of imagination a priori, by which and according to which the images are rendered possible at all, which however have always to be connected with the concept only by using the schema which they designate and with which they per se are not totally congruent" (ibid.).

Kant anticipated the process of developing and establishing as well as applying cognitive constructs for the imaginative realization, visualisation of mental configurations and models, i.e. of cognitions. Cognitive psychology has only since few decades in the wake of theories and concepts of Gestalt psychology rediscovered this concept of schemata as "imaginative" cognitive constructs (cf. e.g. Rumelhart 1978).

Schemata or schemes are called by Rumelhart "the building blocks of cognition" (1978). Psychology discovered that not only visual conception and sense perception in general, but also conceptual and common sense or naive theoretical cognition would operate in terms of the developing and applying schemata, i.e., any cognitions, interpretations,

knowledge whatsoever are bound to the application, selection and activation as well as checking of schemes (see, e. g., Neisser). The process of interpretation is basically to be seen in the or even as the selection and activation of possible configurations of schemata which are verified under the perspective whether or not they are congruent with thought data-fragments of memory. Beyond that, this process is an active process of searching for and structuring information.

In general, we use mental representations of frames or data features or contents which are typified, generically distinguished and concentrated to relevant features which are retrievable from memory.

One may well ask whether or not the expressions and concepts of "structure", "construct" and similar concepts like "strategy", "script" (after Schank-Abelson, 1977), "frames" (after Minsky and Goffman), pattern, "configuration", "conceptual schema" etc. are essentially referring to the same concept, namely "schema". There is no explicit, really non-circular definition of 'schema'; therefore, Rumelhart concentrates on developing a schema theory which proceeds by giving essential features within hypotheses and thereby an implicit or functional or "operational" definition of the functional concept of "schema".

Rumelhart (ibid., 1978) compared the concept, role, activation and function of a scheme with similar concepts of structured activities. For example, schemes are for him **like** theater stagings: the instantiation or activation of a schema is like the staging of a drama, the internal structure of the schema referring to the script or plot. Similarly, schemata can be compared with theories, computer programs, parsing analyses in linguistics etc. In all these cases we have procedures and functional shaping of reconstructions which comprise variations, checks, ramifications and extensions as well as a judgement about fitting or falsification, substitution or modification of a construct by another one. It is characteristic that schemata are connected with other



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schemes and sub-schemes in a certain hierarchical architecture and those schemes have variables connected with different aspects of the environment and the diverse instantiations of the schema.

It is important to notice that schemata consist of sub-schemes. The activation of a subschema is usually immediately related with the activation of the scheme itself and the other way around. The comparison of schemata with programs, networks etc. is certainly fruitful and can be visualized in flow charts and related structural means admitting of state and point identification of the constituents and the ramifications of such structures.

Schemata are more abstract and general than a drama or its plot and script. Schemes may be applied to things, objects, shapes and events as well as any spatial, static or functional relationships and constellations.

The instantiation of some such scheme may indeed be considered as an analogue of the staging of a drama whereas however the concretisation and instantiation of the variables allow for greater flexibility and openness than interpretation by the actor or director.

Schemata would represent or mirror so to speak our internal models of the respective situations in the world: Methodologically speaking, (scheme-) interpretation is but the (re)activation of schemes. It is true that according to modern cognitive psychology the interpretative structuring of sense perception the comprehension of texts as well as memorising and the solution of problems is essentially dependent on the selection, (re)activation and instantiation of schemata. Not just the interpretation of a situation, but also active information seeking as well as the integration into contexts and the development of strategies for problem solving will follow the lead of partly concept-guided, partly data-guided application of schemes. The mutual activation of schemata and sub-schemes is essential. In general, the concept of schema or cognitive construct or even interpretational construct is a rather fruitful instrument for

developing a cognitive psychological theory, but beyond that also for a new methodological epistemology. Cognitive constructs, schemata and interpretational constructs are really "the building blocks of cognition" (Rumelhart) and of any mental representation or meaningful information. (The same is, by the way, true for the structures of actions☺)

Kant already had recognized that the dynamical and structural as well as functional visualization of abstract constructs is schema-dependent and this is not only true for empirical procedures of grasping, i.e. all forms of cognition and action, but also for methodological constructs. One may develop a sort of non-foundational transcendental philosophy of the fundamental conditions of any development, application and stabilization of any procedures of structuring by any kind of representation, be they by frames, concepts, orders, unifications, configurations etc. Interpretation is indeed the development, stabilization and activation (application) of mentally representing constructs or schemes. Interpretation (in a wide sense) is basically scheme-interpretation and founded on this as well as grounded in schema activation. Therefore, I talk of schema- or scheme-interpretation. We can even conceive of a basic axiom or principle of methodological (scheme-)interpretationism stating that all kinds of grasping, cognition - and action! - are interpretation-dependent, i.e. founded on the activation of schemata. This is true far beyond psychological theories and epistemological perspectives, but rather a totally general methodological comprehensive approach comprising the philosophy of knowledge (traditionally called epistemology) as well as philosophy of action and representation. We can call this approach a methodological and transcendental construct- or scheme-interpretationism overarching even the modern split between natural and social sciences as well the humanities, since all these disciplines would structure their fields and objects according to the activation of schemes by using procedures of establishing, stabilizing and activating

schemata as cognitive constructs in order to structure the respective world versions and sets and representations of objects or events, structures, procedures etc.

It is important to note that scheme-interpretation admits of levels of categorisation according to the variability of the respective schemata, i.e., whether or not they are hereditarily fixed or conventionalized or flexible, whether they are subconsciously developed and activated or consciously conceived and used. Therefore, it is only an almost necessary consequence to design a hierarchy of levels of interpretation consisting according to my proposal of six different levels or plains of interpretation listed up in the diagram:

#### Types and Levels of interpretation

IL<sub>1</sub>: practically unchangeable productive primary interpretation ("Urinterpretation") (primary constitution or schematization, respectively)

IL<sub>2</sub>: habit-shaping, (equal) forms-constituting pattern interpretation (ontogenetically habitual (ized) form and schema categori(al)ization and preverbal concept-formation)

IL<sub>3</sub>: conventional concept formation transmitted by social, cultural and norm-regulated tradition

IL<sub>3a</sub>: ... by non-verbal cultural gestures, rules, norms, forms, conventions, implicit communicative symbols

IL<sub>3b</sub>: ... by verbal forms and explicitly representing communicative symbols, metasymbols, metaschemata etc.

IL<sub>4</sub>: applied, consciously shaped and accepted as well as transmitted classificatory interpretation (classification, subsumption, description by "sortals", generic formation of kinds, directed concept-formation)

IL<sub>5</sub>: explanatory and in the narrow sense "comprehending" ("verstehende"), justifying, theoretically or argumentatively substantiating interpretation, justificatory interpretation

IL<sub>6</sub>: epistemological (methodological) metainterpretation (plus meta-meta-interpretation etc.) of methods, results,

instruments, conception of establishing and analysing interpretative constructs themselves

To note and explain: The different levels of interpretation are the following ones: IL<sub>1</sub> comprises the practically unchangeable productive primary interpretations of primary constitution which might be represented by subconscious schema instantiation. They comprise the hereditarily fixed or genetically founded activation of selective schemes of sense perception (e. g. contrasts of dark and light etc.) as well as the interactive, selective activations of early ontogenetic developments like the stages of developmental psychology as, e.g., discussed by Piaget. Also comprised are the biologically hardwired primary theories which we cannot alter at will, but which we can (only) problematize in principle. For instance we have no magnetic sense or capacity to trace ultrasound like the bats. But we can conceive of conditions in which we could have these senses or at least devise technological means for substituting these.

- On level IL<sub>2</sub> we have the habitual, quality forming frame interpretations and schema categorisations as well as "categorializations" that are abstracted from pre-linguistic discriminatory activities, experiences of equality of shape, similarity of presentation and experience etc. Establishment and discriminatory capacity of pre-linguistic conceptualization and development of concepts about language is to be formed on this level. - On level IL<sub>3</sub> we have conventional concept formation, namely socially and cultural traditional conventions and norms for representation and forms of discriminatory activities like the explicit conceptualization of framing the world according to natural kinds etc. In so far as this is not related already to language differentiation we can think of a sublevel (IL<sub>3a</sub>) on which pre-linguistic convention (alisation) are characteristic. On the other hand (on IL<sub>3b</sub>) we have the explicitly linguistic conventionalization or the differentiation of concepts by means of language. - Level IL<sub>4</sub> would comprise the

consciously formed interpretations of embedding and subsuming as well as classifying and describing according to generic terms, kinds etc. It is the level of ordered concept formation and classification as well as ordering and subsumption. - Level IL<sub>5</sub> would go beyond that by rendering explanatory, or in the narrower sense comprehending ("Verstehen") interpretations as well as justifying a theoretically argumentative interpretations in a sense of looking for reasons and grounds of justification.

Beyond all that, however, we have also a level (IL<sub>6</sub>) of the epistemological and philosophical as well as methodological interpretations of a meta-character, overarching and integrating the procedures of theory building and theory interpretation, methodology and the models of interpretation in the sense of methodological scheme-interpretations itself. One could call this a Meta level of interpretation and explicitly speak of epistemological meta-interpretations and meta-meta-interpretations etc. Indeed, this level is a cumulative one and can be considered as being open towards further meta-levels.

In general, the approach of epistemological scheme-interpretations is certainly interpretative and can be described and developed only on a certain respective meta-level which is to be seen within the level IL<sub>6</sub>. Therefore, we have to take into account the possibility of self-application of the interpretative method to interpretative procedures itself. The philosophy of schema interpretation is essentially one of interpretative constructs as an epistemological model which admits of a certain kind of meta-theoretical and meta-semantically self-application in the form of a sort of "meta-interpretation" and, cumulatively, of higher meta-levels, respectively.

All applications of schemes are schematizations or schema-interpretations or, as I would like to label these schema concretizations, interpretative constructs and their activation scheme-interpretations (for short, interpretations), respectively. The latter ones are to be distinguished from the

usual text interpretation in hermeneutics. Schemata are at times used consciously, or they are frequently activated subconsciously. Very important to note: Any "interpretation" (as a process) is based on or bound to such activations of schemes - and even already on a subconscious level in the sense organs. This application might be characterized by features and central stimuli which have to be selected, even though many of these schemes are certainly activated subconsciously. On the subconscious level, formative quasi-constructs or patterns are used to render better profiles of contrasting and the necessary structural differentiation by activating the respective senses and their areas and units in the brain as well as the centres of multi-modal and combining the respective as yet hypothetical integrating centres. Schemes like those may be partly hereditary and evolutionary, partly they are developed by early ontogenetic differentiation through interaction with the external world; thus, to a great deal they will be learned by experience and instruction or imitation.

All schemes are activated on a psychological, including the neuropsychological, level as well as on neuro-physiological or neurobiological<sup>2</sup> and even biochemical sublevels, mainly

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2 Recently, the modern neurosciences are on the brink of providing a naturalized theory of schema development, schema activation and stabilization as well as schema reactivation. Brain researchers think of the brain as an interpretative system" (Roth, 1992, 120, 1994) or of "brain constructs" (Singer, 1990, 8) which are based on the establishment and development of plastic (i. e. flexible though relatively stabilized) neuronal assemblies (von der Malsburg 1986, cf. also Rakic-Singer 1988). The forming and the establishment of neuronal assemblies is hypothesized as being a building-up and stabilization of the frequency phases of oscillatory reactions of different overlapping co-varying and co-oscillating neuronal entities and the neuronal assemblies or networks which are activated simultaneously and selectively on adapting to a

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in the neo-cortex, but also beyond or “below” that in overarching reaction, behaviour and action systems or by the ways of sub-cortical centres as, e. g., the limbic system. Schemes can be analysed from an epistemological point of view taking a broader take-off than in Kant’s approach; more generally they may be modelled as methodological constructs. Whenever we “grasp” and compose (sort of representations of) phenomena and the results of categorizing them under generic and generalizing perspectives, e. g., by using general or abstract

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certain rhythmic ground oscillation of 40 Hertz and a respective process of synchronization of these oscillations which are starting to oscillate in common phase. Such a theory of the synchronicity of building up and dynamically stabilizing a certain kind of oscillation pattern and initiated impulses in the physical sense seems to be a potential explanation for the recognition of patterns, representations of forms and recognition of mental states of activities as well as mental imaginations and retrievals from memory. Therefore, we have special grounds to hypothesize about the neural biological and neuro physiological foundations of the schematization processes and establishment of constructs within the brain and in interaction with the external environment of stimuli and representational 'encodings' as well as "active" interaction and intervention with it. This can also be related to the development of neurons and perceptual as well as cognitive capacities in developmental psychology and physiology, cognitive science and neuroscience and may potentially render a naturalized basis of the processes of formation of knowledge, perception and cognition in general. I don't think, that all semantical programs of meaning and epistemological problems of intentionality can be naturalized in the strict sense. We are not yet able fully to straddle the "semantic lacuna" - even not in teleological-functional approaches like Millikan's (1984) well elaborated one.

representations, if ever equalities of form or shape and similarities as well as analogues (analoga) of all these are at stake, we use more or less general concepts like those of kinds, natural or conventional ones. When we try to identify, retrieve, recognize shapes transcending a particular phenomenon “within” the so-called qualitatively “Given”, we would necessarily rely on the activation of such schemes. Each particular conceptual knowledge, any recognizing and generalising process is based on or at least bound to cognitive schemes which can be conceived of as a sort of abstract constructs (“interpretative constructs”) which are developed or designed and then projected by us into representations and actions as well as, if mostly sub-consciously, into the apparently direct sense perception and the respective experiences by recognizing seemingly organised patterns, shapes (“Gestalten”<sup>3</sup>) or in the process of

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<sup>3</sup>Cognitive psychology has only since few decades in the wake of theories and concepts of Gestalt psychology rediscovered this concept of schemata as "imaginative" cognitive constructs (cf. e.g. Rumelhart 1978, 1980). Schemata are called by Rumelhart "the building blocks of cognition" (1978). Psychology discovered that not only visual conception and sense perception general, but also conceptual and common sense or naive theoretical cognition operates in terms of the developing and applying schemata, i.e., any cognitions, interpretations, knowledge whatsoever are bound to the application, selection and activation as well as checking of schemata (see, e. g., Neisser 1966, 1976). The process of interpretation is basically to be seen in the or even as the selection and activation of possible configurations of schemata which are verified under the perspective whether or not they are congruent with thought data-fragments of memory. Beyond that, this process is an active process of searching for and structuring informations.-In general, we use mental representations of frames or data features or contents which are typified, generically distinguished and concentrated to relevant

constituting objects, processes, events and so on. Any activity of seeing or recognizing shapes and forms is dependent on and guided by figurative schemes. Any cognition is therefore schematic. This holds true not only for cognition and re-cognition as well as knowledge, but also for actions, including all kinds of “grasping” objects.

As already mentioned, schemes consist of sub-schemes and would activate these and in turn be reactivated by the latter ones and the other way around. The (re)activation of sub-schemes is usually directly correlated with the activation of the schema itself and vice versa. The comparison of schemes with networks, computer and organisation programmes etc. can be visualised in maps, flow charts representing states and the constituents as well as the ramifications of such structures. Not only on the psychological, but also on the somewhat more abstract and methodological, level schemes do in a way represent (the structural relationships of) our internal models of respective world situations: Psychologically and methodologically speaking, scheme-interpretation is indeed mainly the activation or, mostly, **re**-activation of schemata<sup>4</sup>. (Of course, this very epistemological modeling is itself shaped by schemes, though on a meta-level. We could and should speak of meta-schemes here.) The rather methodological scheme-interpretationism developed (e.g. in my 1993,

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features which are retrievable from memory.

<sup>4</sup> According to modern cognitive psychology the interpretative structuring of sense perception the comprehension of texts as well as memorizing and the solution of problems is indeed dependent on the selection, (re)activation and instantiation of schemes. But not only the interpretation of experienced situations, but even active information retrieving and searching as well as the integration into contexts and the development of strategies for problem solving will usually be at least partly selected and guided by concepts, which also means the application of schemes indeed.

English in my 2003, 2007) may be understood as a kind of meta-philosophical approach.

In summary, I would indeed like even to conceive of a basic axiom, doctrine, or principle of methodological scheme-interpretationism stating that all kinds of “grasping” (see my 2003), cognition and action are interpretation-dependent, i.e. founded on the activation of schemes. This goes beyond the respective psychological theories and perspectives, but it rather amounts to a wider general methodological approach comprising the philosophy of knowledge (i. e. epistemology) as well as to any philosophical approach to structured actions and representations. We may see this approach basically as a methodological and even, in a sense, quasi “transcendental” construct- or scheme-interpretationism bridging even the rather recent gulf between the natural and the social sciences as well the humanities including philosophy itself. In fact, all these disciplines do “structure” (i.e. representationally construct and re-construct) their fields and objects according to the activation of schemata by using the procedures as outlined of establishing, stabilizing and activating as well as utilizing schemes as patterns or constructs in order to display or render differentiated structure(s) to the respective world versions and the objects, or events, “underlying” procedures, relational and ontological structures as well as projections of any type.

Most of what I said about schematisation, constituting and even construing models, patterns and schemes in the narrow sense can also be extended beyond linguistic and hermeneutical approaches, as we have seen in connection with the structuring and schematisation of “graspings” of all kinds (see my book “Grasping Reality, 2003). That means that you can even expand Wittgenstein’s model of “language games” towards schema games (see my 1995) beyond the limits of the verbal and purely linguistic. This is easily also gained by insights of the new neurosciences (see e.g., my 2004).

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INTERPRETATION, INTERPRETATIVENESS AND  
HERMENEUTICS

After Kant’s famous Slogan “Gedanken ohne Inhalt sind leer, Anschauungen ohne Begriffe sind blind“ (CPR 75, „Thoughts without content are vacant, intuitions without concepts are blind”), we might formulate a similar more general methodological statement: Scheme-interpretations without activation, without interactions and even interventions are vacant and interactions as well as interventions without scheme-interpretations are blind (see, e.g., my 1998). Interpretation, notably in the form of scheme-interpretation, is almost always dependent on interaction and intervention and vice versa. All this amounts to a new collusion or collaboration between the traditional methodological perspectives of action theory and epistemology. I think that here even be might found a “bridge” between the scientific approaches of structuring by theories and concepts and everyday knowledge and structured actions, though usually at the price of a more abstract analysis and by ascending to a higher meta-level.

The approach of schema-interpretation is a rather general, abstract methodology but it is a pragmatic and comprehensively applicable interdisciplinary methodological, even meta-methodological approach which overarches the conception and building of theories, concepts, and hypotheses of the most diverse disciplines indeed.

Certainly there are differences and incompatibilities below the rather abstract higher-level unity or methodological parallelism. For instance, humanities would frequently concentrate on “objects”, which are at least in part produced by interpretation, i.e., fictive or “virtual” objects and fictionalised ones – like also the social sciences in dealing with human-made institutions, social structures as rules and

norms etc. Even “the state” or what institution whatever are not just things but rather fictions, social fictions, gaining secondary social existence like being held valid on the side of many humans believing in them, or, their aims and rules etc.

To note, science is also the work of humans consisting of human made concepts, theories, hypotheses, instruments etc. (This is true, even in the light of the undeniable insight that scientific constructions are not just at will, but checked on a rigorous basis by experiments etc.) The/a unity of the sciences may only be achieved on a higher methodological level of abstraction under this perspective of a scheme-interpretationist or interpretation-constructivist approach and may itself be analysed by again using models of a higher level. In so far you can say that scheme-interpretationism is a higher-level “bridge” between separated “science cultures” as well as between cognition and action. So we may resume and reinstall a higher-level unity of methodological provenance between the different polarities. This may now even be shortly exemplified with regard to the history of hermeneutics.

Already in traditional hermeneutics a sort of perspectivism was emphasized, e.g. by Chladenius in 1742, who conceived of knowledge according to the selection, distinction and, comparison and usually if not always from a point of view: He would even speak literally of a “Sehepunkt” (point of viewing, 1969, 187). He also directly mentioned “perspectives” indeed, in the humanities as well as in other disciplines relying on interpretation of whatever kind. A certain kind of perspectivism is necessary involving some kind of constructivist approach. Already Chladenius saw clearly (ibid. 518) that he would be obliged to have taken over this “Sehepunkt” in all interpretations under a perspective or constructive approach, being a sort of interpretatory activity, a kind of art so to speak.

The same insight plays a decisive role also in Schleiermacher’s approach who would explicitly talk of a

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“creative synthesis”, a concept as an intellectual “schema” (relying of course on Kant) by which a subject may relate towards an object and by which a thought may be represented as the result of a synthetic and symbolized achievement or result of an intellectual activity. This constructivist, “poietic” or object-forming constitutive function of language is already in some sense acknowledged by Schleiermacher; he already speaks of the “schematism” (“Schematismus”)(again after Kant) and of a “community of thoughts and thinkers” (“Denkgemeinschaft”, Schleiermacher 1977, 443ff, 29) within a “language community”.<sup>5</sup>

The constructive element is much more explicitly stressed by Dilthey: Like Schleiermacher he talks about reconstructions in the processes of any “given talk” in the formal rules taking up the remarkable quotation from Schleiermacher (1974, 31): “I do not understand anything except what I can construct and see as necessary” (a statement, by the way, already proposed by Vico and Hobbes before). Dilthey would (WW vol. 7, 220) expand this by saying: “Thus originates meaning (or sense), (‘Sinn’, H.L.) by determining the undetermined by the construction”. He is convinced that any constitution is constructive and that

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<sup>5</sup> Herder already (WWW 1994, vol. 10, 117f) would criticise Kant for his not having taken into consideration that already primary (external) sense perception would really be “schematized”. Schematization would not only occur in the capability of the understanding (“*Verstandesfähigkeit*”), but would be already meta-schematized (“*metaschematisiert*”) in the fact and object itself. Indeed these are *analytic* or ideal type differentiations of a methodological or epistemological kind, not time-bound successions in the form of phases as already Kant knew (“All knowledge would start with experience!”). Unfortunately, the homunculus terminology that the “understanding” would manipulate the sense materials tends to obfuscate these insights.

interpretation is a constructive activity of the acting subject. And he rightly criticizes Kant to the effect that the latter had only seen categorization mainly as a problem of pure knowledge, i.e. of the application of the pure forms of the understanding (“Kategorien”). Instead, Dilthey rightly thinks that one has also to add the rules and forms of action, rules and forms of lives relating to the fundamental constitution of orientation in the world. That would fit exactly to the higher-level formal reunification of knowledge and action obtaining not only in modern philosophy since Pierce’s pragmatist approach and in the ideas of the late Husserl about the respective “life-world” (“*Lebenswelt*”), but also of the later Wittgenstein in the form of his “life-forms” (“*Lebensformen*”) and in some variants of pragmatic realism as well (see my 2000 and 2003). Indeed, the later Wittgenstein holds that meanings are to be reduced or at least necessarily combined with us(ages) of actions, patterns, i.e. rule-confirming sorts of schematized pattern-making – developments which might be captured by the concept of “pragmatizing” semiotics and semantics as well as “functionalizing” and somehow “socializing” meaning (see e.g. my 1995 and Lenk-Skarica 2005 and 2009). It is important to know that even the function of relating towards objects or “grasping” objects (see my 2003) and statements by understanding is basically not only constructive and designative, schematizing – in short, interpretative –, but in many ways also active. Understanding thus also is a sort of disclosing or unfolding constitution and reconstruction as for instance also Gadamer (1960, 1986) exemplified by drawing on the example of the constitution of the works of art or play by analyzing these phenomena as the realization of a certain patterned activity under rules.

### TOWARDS AN INTERPRETATIVE HIGHER-LEVEL REUNIFICATION

At the beginning of this paper the problem of the “two

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cultures” was broached and the expository question for a possibility of bridging the meanwhile outdated cleavage between the natural “scientific” and intellectual ‘cultures’ was brought up. It was in a sense answered from a higher-level methodological and meta-theoretical point of view.

However, a more drastic cleavage seems to remain between the (natural) scientific and literary intelligence including scientific theory building and complex computer-based information technological approaches, on the one hand and everyday experiences and activities using and being represented and formatted just everyday language concepts on the other side. The question is whether epistemology may have something to contribute to the bridging of this kind of follow-up “culture separation”. Some more subspecies might be resumed in the final section. By contrast to the first appearance of an absolute “gulf” of the above-mentioned cultural cleavage between the natural, social and human sciences, we have seen that philosophical concepts of natural and social sciences as well as epistemological insights lead us to the result that there is a certain more abstract, higher level epistemological approach being capable of “bridging” or making compatible the separation the different disciplines, yet indeed on a higher methodological and/or meta-theoretical level. The “bridge” is provided by the conception of constructive interpretation or scheme-interpretation and by the respective interpretative and schematizing activities of action and knowledge by symbols and internal representations patterned also by symbol-analogue functions and patterns. Knowledge and action are mediated by some sort of special symbols or quasi symbolic representations as well in everyday activities as also in the sciences and humanities.<sup>6</sup>

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<sup>6</sup> The new approaches of mathematical dynamical systems theory and the respective dynamical modelling in cognitive science seem to point in the same direction (see, e.g., Port – Van Gelder 1995, Van Gelder 1997, 1998 and my 2011, in press).

Traditionally, it was already Cassirer’s insight (1944, 1990) that man would insert a “symbolic intermediate world”, “a symbolic universe”, between himself and the world. Man being the symbolic animal is dependent on developing a “symbol system” or “symbol net” which only allows him now to have access to the world by knowledge and action and even by constituting a world of objects structured in a differentiated manner. Symbol application and symbolic representation are characteristic for the different ways of representing and acting on both sides of the cultural separation as well. Here we have an overarching point of view providing a vantage point for bridging the cleavage on a higher epistemological or methodological level, for all the central concepts of knowledge and action in everyday contexts as well as in science and humanities are relying on constructing symbols, applying symbols and interpretation of these. As we saw they are based on interpretative schematizing activities, on supplying schemata which are in part “given” by evolution or so developed, which are in other parts conventional constructions by the traditional cultural or social institutionalization or by language and socio-cultural schemes in the narrow sense. The development, differentiation, and application of these patterns are understood as interpretation in the widest sense, i.e. as scheme-interpretation. (The traditional hermeneutical understanding of texts would, by differentiating contradiction, figure as a sub-category of a kind of scheme-interpretations by applying them to texts.) It is true that all sorts of representation and access to the world, to other subjects as well as to the situation of a person and human being in a “Lebenswelt” are deeply interpretative, structured by scheme-interpretations and in general unavoidably shaped by interpretations and impregnations in the above-mentioned sense. The basic principle of methodological scheme-interpretationism is that all knowledge, any “grasping” and actions are impregnated or bound by

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scheme-interpretation and that we can only in a schematized manner “grasp”, conceive of, mean, order and act in a differentiated way. This fundamental principle cannot be doubted at all. It is the kernel and basis of the methodological epistemology of scheme-interpretation and of the respective theories. Even in neurophysiological terms this might be understood as the activation of neocortical and sub-cortical networks (neuronal assemblies) being a sort of biologically instantiated schemes of interpretation, namely the activation of neuron systems in different parts of the brain. Also here scheme-interpretation is working everywhere as neuro-biological research has found out, even if not very much can be said at the moment about the processes of integration and syntheses on the higher meta-levels. Beyond that, central concepts of ‘symbolic grasping’, certainly themselves are part and parcel of this interpretative approach: not only is the model of interpretative constructivism an epistemological construct of a higher level, but also the basic concepts of this methodology and its everyday arsenal of concepts like ‘meaning’, ‘information’ are in turn themselves interpretative constructs like all more general concepts of “structuring” our world and even self-representation. Even the concepts of “self”, “world”, the distinction between subject and object, of knowledge and action, of form or structure and content are certainly epistemological-methodological concepts displaying an interpretative character.

Beyond Cassirer however, this approach has to be expanded towards an anthropology of the meta-interpreting being (my 1995 c and 2007, chap. 3). Humans are not characterized specifically enough as the symbol applying and symbol interpreting beings (also primates can do that, though in a residual way!), but humans are distinguished by being able to interpret their interpretations again by interpretations on a higher level, to make cognitions, actions, and interpretations the objects of a higher level interpretation or meta-interpretation for that. Humans may differentiate,

distinguish, and interpret not only within this specific level or stratum of interpretations – say by conceptualizing different classes of objects, properties, relations etc. – but they may also ascend to higher levels of interpretations by making their interpretations as higher interpretations themselves in turn the object of even higher meta-level interpretations. This is an open overarching of strata and levels not to be finished at this or that specific overall general level, but open for indefinite ascension – though not in practice but in principle. The human being therefore is the meta-symbolic being of the meta-levels the meta-schematizing and super-interpreting being par excellence. It is this possibility of emancipation from the application of symbols on a specific object level or in an object language which would, to my mind, characterize the human being as the meta-interpreting being (see my 1995c, 2008).

Methodologically speaking it is clear that with the conception of scheme-interpretations and of the interpretative schematizing activities we have found a rather comprehensive promising attempt and model comprising the hypothetical theories of natural scientists as well as the conceptions of meaning and understanding of the humanities (also including philosophers and methodologists themselves) as well as of the conceptualizations in everyday life. Of course, some differential distinction or contrasts even incompatibilities in the sense of specific disciplinary perspectives are not to be denied by this. (To analyze these differences would be the task of a special scheme-interpretationist philosophy of science or hermeneutics etc.) In a sense, already traditional hermeneutics of understanding had developed a fruitful approach as regards some methodological interpretative rules (usages and presuppositions of (re)interpretation of texts). This kind of hermeneutical methodology is but a rather special case of our wider and comprehensive interpretation-constructivist approach.

Beyond all that, however, philosophical hermeneutics

starting with Dilthey, but notably being forwarded by Gadamer as well as Blumenberg to have a certain kind of hermeneutical “shaping of the world” or, rather, representations of versions of it - and even of the self. The constitution and methodological concepts as well as presuppositions are certainly to be interpreted as special cases of methodological constructive interpretationism in the mentioned general sense. However, thus far hermeneutics, even “world hermeneutics” remained all too much within and under the spell of text-interpretationism subdued by what I call “the paradigm of reading”: the world should so to speak be interpreted as a “text”; even actions would only be understood as texts (Blumenberg’s “Readability of the World” as a book title, 1981). Universal hermeneutics was fixed to the rather repeated construction of text-interpretation and could only by and large open up toward a (scheme-)interpretationism as a more general approach. Thus, traditional hermeneutics as well as universal hermeneutics did not succeed in involving the schematizing activities on a neuronal and biological (neurobiological) basis providing the vehicles (neuronal correlates) of all symbolic-interpretative activities of the organism and its pertinent embedding(s).

However, under the perspective of a generalized concept of interpretation as schematization and the activation and stabilisation of schemes we are able to unify, though on a higher level as mentioned, the basic biological and neurobiological patternings of our actions and motivations, with their conventional, learned scheme-activations and stabilisations of a social and cultural provenance etc. and knowledge and cognition with those of symbolic and cultural conventional provenance under a sort of theoretical and meta-theoretical roof. The same holds true of the combination of everyday knowledge, of any common action etc. under the general abstract methodological (or, if you wish, quasi-transcendental) perspective of scheme-interpretationism or interpretative constructivism of a

nevertheless realist sort (see my 2003). We can thus find in the end a certain reunification of epistemology and action theory and their relevant disciplines under a sort of scheme-interpretationist symbolic anthropology, though paying the price of a certain kind of formality and abstractness by reaching the unified result only on higher levels. The unity of knowledge and action is reinstalled on a higher meta-level, namely that of rather abstract interpretative forms, rules, methods, requirements, and results of schematizations, i.e. scheme-interpretations. This is a very relevant result not only for the philosophy of the sciences but also the humanities. Indeed, the latter ones are indispensable for the understanding and forming of the sciences, too (Nussbaum 2010).

#### THEORY SHAPING ALSO BY INSTRUMENTATIONS AS ACTIONS

By turning explicitly against the all too general methodological theoreticism, Ihde has tried hard for decades to integrate phenomenological epistemological approaches and what he calls “instrumental realistic” perspectives in the philosophy of science and technology, (the philosophy of) “technoscience” (1991, 138ff). He was certainly not the first author to stress the interconnections and the integration of technology in science, in methodology and actual experimentation as well as world formations diagnosing a “design of an artificial environment as whole” as a progressing substitution of the natural environment “cultural world” created by humans. As early as 1970, I already talked about the transition from the so-called “scientific age” towards “the information- and systems technological age” (Lenk 1971)<sup>7</sup>. Ihde took the approach on a rather

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<sup>7</sup> See also Rapp and myself regarding the comparison of methods in science and technology, highlighting the ever expanding technicalization of scientific experimentation and the scientification of technology at the same time (in Lenk/Moser 1973, 180f, 206ff).

encompassing perspective in order to outline and postulate an integrated methodology and philosophy as well as epistemology of "technoscience" (Ihde 1979, Lenk 2007). Already in 1979 Ihde indeed explicitly emphasized the necessity of a social embedding of technology and science (as Ropohl did 1979 independently with his concept of "socio-technical systems" including what Ihde calls (social) "praxis"). Ihde did more comprehensively emphasize the "technological embodiment of science" in a rather literal sense, not only but notably also in "its instrumentation" seeing "a crucial difference" between modern and ancient science... in its technology, its instrumentation" (1979, 1991, XI) and drawing attention to the necessity to study the interface between philosophy of science and philosophy of technology as well as science and technology itself (now integrated by Ihde into "technoscience").

Indeed, some of these representatives differ according to the problem of perception and "seeing" by and through or via instruments and with regard to the role of social "praxis" (social embedding of technological practice) or the integration of technology in science in general, but they all see "the technological embodiment of science" (Ihde 1991, 99) in technology via instrumentation and development of the experiments in experimental science by essentially relying on its instruments, and the respective historical development of these as well as of imaging etc. Some continental philosophers of technology however – including Rapp, Ropohl and myself – clearly saw the accumulating integration and interconnection between technology, science, society and economy earlier (cf. even, e.g., Gottl-Ottlilienfeld as early as 1913 (!), 1923<sup>2</sup>). Whereas traditional, sometimes wrongly so called "positivist", Popperian critical rationalists and philosophers of science did have a contempt or even "disdain for, or ignorance of, praxis", indeed it is social praxis, and the embedding as well as of experimental procedures, pre-formations and constrains scientific objects", effects, processes, and

procedures as well as some so-called "theoretical" entities – that are" often, if not typically, instrumentally constituted. Technology – instrumentation – makes the difference" (Ihde 1991, 99, 102 f): "In its broadest sense, the instrumental realist consensus points up the importance of science's technologies as the means by which discovery occurs and knowledge is expanded"<sup>8</sup>. Ihde goes on to generalize "that contemporary science is more than accidentally – it is essentially – embodied technologically in its instrumentation" (ibid. 103). Heelan (1983) would even think that "only those phenomena which have been instrumentally 'carpentered' and 'constituted' can have claim to scientific 'reality'" which means that there is a necessary connection between scientific observation and its technologies" (Ihde 1991, 105). In particular, "technology reveals the micro- and macroworld which lies beyond unaided sense" (ibid., 107)<sup>9</sup>.

Ihde indeed puts the finger on a very important phenomenon of a methodologically necessary process of the performing of scientific experimentation and instrumentation by the available instruments and the history of their development and as the impregnation of scientific concept formation, "perception" as well as experimental practice by make-up and structuring effects of the apparatuses and instrumentation including the respective theoretical foundations together with the very methodological preconditions of experiments. - However, Ihde seems

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<sup>8</sup> "The means" seems to be a little bit of an exaggeration, since also so-called "progressive problem shifts" after Lakatos (s.,e.g., Einstein's designing of the Theory of Relativity) seem to be possible and necessary: theory should not be totally underestimated, too.

<sup>9</sup> See also Harre's 1986 with the emphasis on "material practice" and "reference hunting" in experimental science as well as his R2 realm of theoretical entities which can be transformed to become visible or graspable, instrumentally speaking.

somewhat to overstate the issue, when he thinks “that the ‘theoretical’ becomes replaced with the instrumentally ‘observable’” whereby this observability in turn becomes part of a new perceptual region: ...” Here would be the (only?) “heart of the ‘realism’ of instrumental realism” (ibid, 107).

If not obedient to what I once (1993, 1995, 1995a) called “the reading paradigm”, “the text metaphor” seems prone to overstating the “reading” and/or “seeing” metaphor, as Ihde himself (Ihde 1991, 113) would probably acknowledge. -

In addition, Ihde would to my mind a bit underestimate the “action-impregnatedness” or “activity-ladenness” of experimentation besides the instruments by tendentially over-accentuating or even exaggerating “perception”. The extant theories of action and even the activities of model designing, structuring or schematization of action – also in forming knowledge and perceiving – seem to have been underestimated to some degree, although implicitly all this is certainly somehow involved and unnoticeably accounted for.

With all of this, we are at the point of reaching my approach which I had developed since three decades by now, namely the realism of a “methodological interpretationist” provenance or “methodological scheme-interpretationism”. In short, we may say: We conceive of the world as being real, hypostatize it, for practical and theoretical reasons, as “real”: The world is real, but any grasping of it or of parts of it or entities in it is always impregnated by or bound to interpretational perspectives, i. e. is interpretative, schematized, or “theory-impregnated”, “theory-laden” etc. World is always represented only in/by world versions! Any “grasping” whatsoever (in a double sense) is to be understood from a scheme-interpretationist approach and is beyond that to a large extent also shaped and structured by actions, action-forms, or presuppositions. This is the main idea to be added (see my 1998, 2001).

I think it is very important for a philosophy of science to stress this. The same is certainly true for Giere’s (1988) experimentalism and modelism in philosophy of science.

We need knowledge and action as well as experimentation and instrumentation. We know that gaining knowledge is a sort of action, at times an higher-level activity, namely, e. g., indeed exactly the acting with models, preparations or experimental arrangements (think of quantum theory and its “preparations”, the so-called “measurement problem”): To be sure, we need constructions, we know that all our “grasping” is structured, schematized, to a large extent “constructive” indeed, but it is equally true that knowledge and insights in experimental science are not but constructions and interpretations or interactivities at will just fitting to arbitrary models whatsoever, but as, e.g., Giere (1988, 1999) rightly stresses the models and their fit are not relativistic or arbitrary. Indeed, they are bound to strict and stringent requirements of experimentation, objectivity and inter-subjectivity, repeatability, etc., according to the traditional rules and norms of “good” scientific practice. This is the element of realism in the otherwise rather perspective and constructivist model-making and theory-building activity of the scientist or group of scientists frequently described by using a certain Kuhnian “paradigm”. As I had stressed time and again (cf. my 1998, 2003) gaining knowledge, constructing, acting and intervening as well as interpreting go necessarily together. Instead of misleadingly just introducing and highlighting models and falling victim to some kind of dichotomizing strategies, philosophy of science has to take seriously the insights that we need models and laws as well as theories.

With regard to the traditional approaches of philosophy of science it is true, that usually the propositional approach wrongly interpreted theories<sup>10</sup> and hypotheses as well as

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<sup>10</sup> Theories, generally speaking: methodical and methodological concepts as well as normative structurings of actions and procedures are guided by interpretations and

models as just linguistic entities. It is certainly an interesting problem to analyze and discuss how these analytic differentiations hang together with the real world or the respective evidences or resistances or make-ups ("preparations") in the situation of experiments. I think indeed that the idea raised by quantum mechanics that the initial preparation is of very much import, may even be or feature as the rather general case, i. e., there usually is a certain kind of interplay generally not to be neglected between questioning, preparing experiments and relevant perspectives in order to deal with experimental reactions from a perspectival approach (see my 2003). Insofar we can even talk about a technologicistic or technology-oriented philosophy of science in a far more general sense, as indeed entertained by methodological scheme-interpretationism and also (although still narrowly restricted in scope) by Giere's modelism ("constructive and perspectival realism") and Hacking's "technological realism" (1983) as well as Ihde's "instrumental realism". In the future, certainly such interactions between approaches of a rather technologicistic

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schematizations. The methodological scheme-interpretationism as developed by the present author (since 1978 and, more explicitly, 1991) is indeed a higher-level methodological and epistemological conception covering from a methodological point of a meta-theoretical provenance the special cases of scientific theories, technological developments and designs, procedures of structuring in everyday knowledge and perception as well as all kinds of action-forming and mental representation. Interpretations are always constructions – as any knowledge whatsoever. Theories are interpretative constructs claiming, as substantive theories (after Bunge 1967, vol. II), validity or even truth – that is to say approximate truth, or verisimilitude, or, as operative theories, methodical or methodological validity. Norms and values are also interpretative constructs, standardized by social or cultural conventions, traditions or, largely, by language.

and action-theoretic provenance with philosophy of science analyses will take center stage in philosophy of science debates. Thus, the indivisible connections between knowledge (gaining knowledge), experimentation and action-orientation (e. g. by intervening) will lead the way (cf. my 1998, 2001). Insofar the approaches outlining the connection between scientific models and real systems by the vehicle of technology, technological manipulation and intermediary instances like measuring instruments and machines have to be extended by the action-theoretic interpretation.

To be sure, the pragmatic technology-oriented approaches by Hacking, Giere and Ihde as well as the action-theoretic interpretation delineate a route to avoid such one-sided exaggerations or even dichotomizations rendering the refined relational interpretation of the interplay between cognitive models, "intended models of theories"<sup>11</sup>, technological realizations and action- or operation-theoretical sequences of operations and experiments. In such a way, the theoreticians may now relate their methodology or meta-methodological conceptions of operative principles to the conceptualization of theories, concepts and hypotheses rendering them rather independent of absolute truth claims in order to rely on relativized concepts as, e. g., the degree of fitting, functional requirements or optimizing (notably "satisficing") plurifunctional conditions which are typical for designs, planning, constructions of all kinds.

A pragmatic philosophy of science can indeed learn a lot from technological and action-theoretic approaches, likewise, or, rather, vice versa, the methodology of engineering disciplines or even what might be called a "general technology" (Ropohl) may gain much methodological stature by considering the refinements and

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<sup>11</sup> The pure axiomatic or even the so-called structuralize approach suffered from too formalist a make-up by understanding theories and their structures exclusively as mathematical structures.

novel developments of philosophy of science under the auspices of general methodologies including theories of action. These methodological approaches have still to be more expressly and neatly integrated into a rather general theory and methodology of scheme-interpretation (cf. my 1993, 1995, 1998, 2016) including a set of perspectives, employing Teleo-functional requirements, theoretical approaches and practical action-routines as well as social conventions and institutional rules and at times specific institutionalizations.

On a higher level a new "unity" of the sciences and technologies as well as intellectual cultures might well evolve and cover the access to the world by action and action-orientation in applying theoretical and interpretive as well as experimental models. Generally speaking the approaches by Hacking, Ihde and Giere are not only explicitly action-oriented, but they are in a certain narrower sense, literally speaking technology-shaped philosophies of science, notably affected by (the existence and development of) measuring instruments and measuring technology. These, however, are the media and means of the respective interactions and interventions into nature and “reality as such”<sup>12</sup>. Insofar we can indeed talk about a techno logistic or technology-oriented philosophy of science in that sense - including an action-theoretical or “actionistic” one (see my 2001).

Technology (technological instruments, measurement appliances, technological approaches and models as well as technical procedures, processes and artifacts) would shape the scientific possibilities of knowledge and gaining knowledge to a decisive extent. This is not only true in the narrower sense, as the so-called New Experimentalism in philosophy and sociology of science would say, but in a far more general and larger sense as entertained by methodological scheme-interpretationism and also (although

still rather restricted in scope) by Giere's modalism, Hacking's technological realism and Ihde's<sup>13</sup> hermeneutical instrumentalism (or realism). Therefore, these approaches regarding the connection between scientific models and real systems by the vehicle of technology, technological manipulation and intermediary instances like measuring instruments and machines as well as interpretations have to be extended by the/a more comprehensive action-theoretic interpretation. This would even be interesting for construction engineers and design theorists as well as the design of software models and respective computer simulations of theories in addition to or instead of the full-fledged analytic theory in the traditional style. As was already mentioned, usually the propositional approach did wrongly understand theories and hypotheses (as well as models!) as just linguistic entities<sup>14</sup>. It is true that the philosophy of science and sociology of science of the New Experimentalism like the pragmatic-technology-oriented direction of the mentioned approaches as well as the action-theoretic interpretation proposed and emphasized here is a route to avoid such one-sided exaggerations or even

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<sup>13</sup> In 1991 Ihde depicted the American discussion among five Anglo-American Philosophers and phenomenological oriented Euro-American Philosophers of technology and science (mainly Hubert Dreyfus, Ian Hacking, Patrick Heelan, Robert Ackermann and himself) who would criticize classical positivist philosophy of science which studied science without perception, technology and experimental instruments. Ihde explicitly calls this group "the school' of instrumental Realists" (1991, 97). (Surprisingly, Ihde did not integrate Giere as an instrumental realist, too.

<sup>14</sup> In a similar vein, the pure axiomatic or even the so-called structuralize approach suffered from too formalist a leaning interpreting theories and their structures exclusively as mathematical structures.

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<sup>12</sup> This term would also pose problems of an epistemological “interpretation” (see my 2003).

dichotomizations rendering more explicitly the refined relational interpretation of the interplay between cognitive models, intended models of theories, technological realizations and action- or operation-theoretical sequences of operations and experiments. This approach will excel on a meta-theoretic level characterized not only by general methodological requirements of any active "grasping" of external or mental entities, but also by certain "ideal" structures, constructions, etc. - Action, "grasping" and knowledge as well as the designing and normative shaping<sup>15</sup> of world versions is in that sense shaped by interpretations, ways of "grasping" and by perspectives – in short, by action-oriented and perspective preparations<sup>16</sup>.<sup>16</sup> Again the analogy to the preparation problem in quantum theory regarding its measurement problem springs to mind.

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<sup>15</sup>With this, certainly a normative component is taken into account, thus rendering a normative part or element within the make-up of the rules and principles of philosophy of science. As such a pragmatic philosophy of science  
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