

Please, do not cite or distribute this paper without the permission of the author.

Higher-level interdisciplinarity by methodological scheme-interpretationism

Against methodological separatism between natural, social and human sciences

Hans Lenk

I. Interdisciplinary interconnections in the information- and systems technological world

It is well known that most of the topical problems of our times cannot be addressed in clean disciplinary separations or total disciplinary make-up, but they are only successfully to be addressed in interdisciplinary or transdisciplinary or even superdisciplinary manner. For instance, ecological problems are not just natural science questions, but of course they are not only cultural or social humanities problem areas either. In the overriding and comprehensive problems of our society and age we encounter a complex of not only internal interaction and interconnection if not mashing of the prospective disciplinary areas. We need more abstract plus disciplinary methods, disciplines and technologies, so to speak generalized operational techniques in order to get a more formal or abstract or methodological perspective we will discuss below. This is even true for the humanities in the narrow sense. It is quite obvious that in the last decades the techniques of information processing, electronic data-retrieval and processing as well as other information techniques have penetrated also the humanities. We deal here generally with information or, to be more precise, interpreted informations as well as processes and results of interpretations. Using a rather technical methodological term, I like to talk of „interpretation constructs“ (1978, 1993) or even by the referring to rather artificial „objects“ by calling them „interpretata“ or even „schematisata“, i.e. the results of schematisations or interpretation processes (qua the activation of schemes) amounting to be a rather „higher order raw“, if not “fine material” of the sciences and humanities as well as the respective information processing disciplines.

During the last century information and the means and possibilities of processing, transmitting and designing as well as manipulating it have been systematically

technologized, so to speak. Already in 1970 I talked of the information processing becoming comprehensively technicalized and systematized, thereby leading to what I called “an information and systems technological age” (1971). This is true certainly for the automatisisation of productions and the embedding of systems in operative networks and intersystematic environments as well as for systemic operational processes and systems control generally speaking. We could only then – all the more today! – diagnose a general tendency towards and an approved turn to systems technology. This is certainly true for the representation of realisations and materialisations as well as the symbolisation in information disciplines, information systems etc. Here we see ever-extending information networks, systems of interconnections embedded in other systems like a Russian doll gaining more and more relevance across traditional disciplinary perspectives. Using computers is of course a main feature in any area of scientific presentation and systematisation, but also in production and operations research and control as well as in administration and social organisation. All these trends are aspects of a rather comprehensive information and systems rationalisation in the highly industrialized societies, which can be dubbed now systems-technological societies in the information and systems technological age. These information and systems technologies characteristically cross, overlap, or reach beyond traditional disciplinary borders and limits not only intersecting, but interconnecting and overriding traditional separations between areas and disciplines amounting to a new interdisciplinary frontier of information technological and to systems expanding processes, phenomena and transdisciplinary interactions and interconnections of whatever sort. One may so to speak talk of a systems technological or systems-technogenic interdisciplinarity. The sharp separations 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 retrievability 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 a personal individual 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 operationalisable, practically applicable, ethics or legislation and executive jurisprudence regarding the world wide information systems will look like.

In a sense, we are of course responsible for abiding by what I call a “concrete” or “practical humanity” (“Konkrete Humanität”, my 1998), and the respecting of that idea in the worldwide communicating and trafficking with informations and in our typically rather remote indirect contacts with partners and addresses of our actions and their far reaching consequences. Questions of the tradition and development of “concrete humaneness” through moral philosophies and humanities are in charge, but that is not to be discussed here (see again my 1998). To say the least, it cannot be the case that the problem areas and disciplines in these overriding fields of worldwide interconnections can be separated from each other. The 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 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 evermore important. This can be called “interdisciplinary” in a true sense. It is now a necessity to go “interdisciplinary” and supradisciplinary 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 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 a proportional perspective.

It is true, that indeed tendencies of a sort of autonomy or independence of systems operations and systems are notably being in danger of developing a systems technocracy or computerocracy, which can only be counter balance by a cross-disciplinary delimitation, control and safety regulation as well as risk-minimisation reaching beyond any single-disciplinary onesidedness. 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”, the universalists approaching the problems of societal aims and social values as well as the methodological and epistemological basics of the respective disciplines and their interrelationships.

This interdisciplinary constitution and the interconnection problems are confronted in the intersection area of many classical disciplines. These problems are only to be addressed across and beyond the single disciplines. There is a necessity to develop interdisciplinary and supradisciplinary approaches – in practice and also from a higher level methodological perspective. Classical single disciplines are as a rule overcharged by the postdisciplinary phenomena, processes and problems of an interareal 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. Therefore I shortly turn to these questions.

II. The traditional “two cultures“ problem

In the second part I would like to say something rather methodological regarding

the development of the so-called humanities and historical sciences in difference but not by contrast to the natural sciences. During the 19th century there seemed to have opened up a total cleavage between the humanities understanding themselves as “the understanding disciplines” (“*verstehende Wissenschaften*”) which provocatively thought themselves in a certain kind of contrast to the so-called “explanatory sciences” dealing with law explanation and a covering-law model comprehensively applied in the theoretical and systematical natural sciences.

To be sure, there are also descriptive natural and historical disciplines like traditional descriptive botanics etc. or biology and geography, but these are also under the grip of law-covering sciences at least since a century now.)

The methods of the covering-law sciences were said to be totally different from those of the humanities. For instance, people said, that the humanities and the ‘humanists’ (“*Geisteswissenschaftler*”) would only “understand” (“*verstehen*”), but not “explain” (“*erklären*”) something and that vice versa the natural scientists would only “explain” but not all “understand”. Already this ironic contrast shows that this cannot be right, even if after a first glimpse of plausibility.

The 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-cultures separation and a respective thesis after C.P. Snow (1967). This two-cultures 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 the “natural scientific” and the “literary intelligence” – which is a rather 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 somehow considered reborn machine stormers. Inversely, these again would hold the natural scientists to a certain extent as cultural barbarians. The question of the border-crossing was according to Lord Snow regarding the knowledge of the Second Principle of thermodynamics rather coolly and disrespectfully received and answered by some representatives of the humanities and literature – like on the side by the natural scientists the provocative question whether and how much they had read Shakespeare, respectively. Snow submitted merely illustrative examples from the Anglo-Saxon countries, but we can also find respective

experiences on both sides in the continental debate.

Indeed, these are often repeated and modified but mainly past contrasts and limitations which 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.

These separations were and are indeed much too rough. Mostly already because they accentuated this contrast from the beginning. But this dichotomy did not fit well even in the past. Mathematics being to be sure a pure “Geisteswissenschaft” or logics did not fit into this dichotomy anyhow. Linguistics and social sciences are neither pure natural sciences nor pure “Geisteswissenschaften”. A notorious example certainly is psychology always sitting between the different branches of a quasi naturalistic, experimental or behaviorist branch and humanistic and person-oriented branch on the other hand. (At least, since the last half century particularly cognitive psychology was obviously sitting between these poles).

Some authors try to establish social sciences as a third (or even fourth or fifth) “scientific culture” in the sense – like Lepenies and Zimmerli. True, there were always mixed discipline, special cases, 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 logic is a “Geisteswissenschaft”) or formal and theoretical linguistics or sub-disciplines like mathematical psychology and mathematical sociology. Conversely, also in the natural sciences we have of course historical disciplines like palaeontology, cosmology, biology etc.

In general therefore 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. Do and did the natural scientists not understand anything or do or can the “Geisteswissenschaftler” not explain anything whatever?

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 not retreat to dogmatism.

Sometimes it is true that provocative and even polemical formulations may lead to a further development: for instance, neopositivism has certainly contributed to the quality and philosophy of science in an important sense meeting the requirements of the first half of the last century being heuristically and motivational very fruitful for the development. But these stances remain sterile, when the dogmatic hardening by the 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. This was certainly known by the greatest theoreticians of the methodology of the humanities and social sciences – like e.g. Max Weber.

III. Types of interdisciplinarity

There are a series of examples from new research areas being *ex ante* in a certain sense interdisciplinary – like, e.g., environmental research or science of science – not to mention again the two branches of psychology. Weingart (1974) has called science of science a “multidisciplinary aggregate science”. The research areas of this discipline are history of science, sociology of science, economy of science, psychology of science, organisation theory of science, methodology of planning, parts of political science and, of course, philosophy of science including scientific methodology and also different philosophical approaches like social philosophy) dealing with a lot of values and ideas or a methodology which the scientists of science would entertain. As yet there seems to be obviously no direct possibility to develop a truly interdisciplinary theory, therefore the term “aggregate science”.

How is it possible to differentiate different disciplines and their types and interdisciplinarity from one another?

Typical differentiations of the disciplines according to their

1. objects and fields or areas
2. methods and arsenals of methods
3. interests of knowledge” (“Erkenntnisinteressen”, Habermas)
4. theories and their systematic interconnections and networks”
5. “theories and their historical interconnections and developments” (Krüger, 1987)
6. the relationship of theory and practice
7. substantiality vs. operationality vs. formality of theories, respectively (Bunge)
8. system holism vs. specificity of domains
9. a priori or analytic formality of methods vs. empiricism
10. explanatory and systematising patterns (e.g. descriptive vs. explanatory, historical vs. systematising)
11. cognitivity and normativity (descriptive vs. normative disciplines)
12. fictionality (virtual realities, “cyber worlds”, e.g., the so-called “second life”) and secondary reality (social “validity or “Geltung”) vs. primary reality (see the concept of “impregnation”, below)

The disciplines are traditionally distinguished with respect to these criteria or markers.

Very important in my mind is the difference between substantial and operative theories (Bunge, 1967) where the latter ones concern procedures, operations, programmings and model-making. Substantive theories would be, e.g., gravitation theories after Newton or Einstein. Operative theories would be for instance information theory, mathematical game theory or general formal procedures and analytic instruments which can be applied in very different sciences. Information technological and information-theoretical approaches are obviously operative theories and very sensefully and importantly applied in interdisciplinary research. Formal theories are of course those which elaborate formal ideal-language concepts like mathematical theories e.g. and the new developments as fractal geometry and chaos theory.

An important differentiation is also the fashionable but usually rather dogmatized polarity between patterns of 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 be a dichotomy of contrasting these approaches in a total and exclusive sense but rather a differentiating combination and approach of dealing with both of them, as the respective research areas may require like, e.g., the descriptive disciplines like palaeo-anthropology, descriptive geography on the side of the natural sciences or linguistic theories and semi-lattices in the formal theories of linguistic.

A rather important distinction seeming to be much more than an absolute or total distinction between different sorts of disciplines is the distinction between *cognitive* and *normative* ones. Cognitive descriptive disciplines are certainly the only 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. (These auxiliary disciplines being in a much more important stance nowadays within the legal disciplines in general.)

An 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. (This has to be addressed again below in connection with the impregnative realistic “interpretations” and the fictive socially and culturally produced interpretations in the narrow sense.)

All these perspectives – particularly those explicitly mentioned as important – lead to different types of interdisciplinarity which are listed in the following diagram.

Types of Interdisciplinarity:

1. Interdisciplinary cooperation in and between projects
2. bi-disciplinary or interdisciplinary research field
3. multidisciplinary aggregat(iv)e science
4. (genuine) bi- or interdisciplinary
5. multidiscipline (with multidisciplinary theoretical integration)
6. generalised interdisciplinary systems theories (general systems theory)

7. mathematical theories of abstract and complex dynamical systems
e. g. deterministic chaos theory)
8. supradisciplinary applied structure- and operations disciplines (e. g. operations research)
9. methodological-metatheoretic supradisciplines (philosophy of science, science of science)
10. philosophical, epistemological and methodological metadiscipline (e. g. methodological scheme-interpretationism)

Some remarks regarding these diagrams and respective types of interdisciplinarity are in order.

Ad 1. The simple cooperation of projects in interdisciplinary research cooperations 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.

Ad 2. 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.

Ad 3. More generally, a respective multi-disciplinary cooperative network of projects within a whole field, as, e.g., in environmental research which seems to have become by now a kind of "gathering" discipline between different input disciplines.

Ad 4. This might be a bordering case towards what Weingart calls "multi-disciplinary aggregate science" (his example is science of science).

Ad 5. From such an aggregative cooperation is certainly to be distinguished a genuine specific interdiscipline as, e.g., molecular biology or biochemistry or even more traditionally physical chemistry.

Ad 6. Then there are the generalized interdisciplinary disciplines of a formal or model-based character as for instance generalized systems theory like the one called "General Systems Theory" (after Bertalanffy).

Ad. 7. The 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.¹

Ad. 8. Supra-disciplinary applied structural and operations disciplines as are to be found in economics in the form of the so-called operations research are pretty old. (However, there are also new ones like the before-mentioned chaos theory if applied.)

Ad. 9. There are methodological-metatheoretical 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.

Ad. 10. Finally we have to mention and probably first of all 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 interpretationism or scheme-constructionism to be discussed in the next section.

Indeed, these ten different possibilities and aspects or types of interdisciplinarity 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 interdiscipline like physical chemistry or again like a mathematical operative theory as mathematical game theory. Here, we have to take into consideration clear methodological distinctions and differentiations.

For all these aspects however, 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

¹ There are not as yet stochastic or probabilistic chaos theories or models beside some sketchy applications and economic approaches to a chaos-theoretical interpretation of social sciences and humanities which would be indeed be rather probabilistic instead of the extant deterministic ones.

many-sided competences would mean to delve into different or diverse sciences involved which is possible for an individual only in a very 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 – is and are necessary conditions for being able to do research, analyse and discuss overriding problems of values and norm systems etc. 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.

Heckhausen (1987, 135) said that in the humanities research in any case is essentially interdisciplinary oriented, because everything is historicised and one has in the last analysis always but different text bases yet that the research method would be rather uniformly the same. I think that this is not true anymore today. However it is true that the stronger contacts, historical traditions etc. are involved in the approaches to be taken the more frequently will this aspect of the contributions of different disciplines become relevant. In the humanities and social sciences there is today a requirement of an especially high interdisciplinary challenge and qualification, be it in research or education.

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 social and 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. 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.

It is true, that at least the “third culture” (Lepenes), namely social science, has to be supposed to (have) overcome the mentioned polarity. Indeed there are additional mixed disciplines and many other sorts of interdisciplinary areas and methods on diverse levels as mentioned before so that even some formal and operational “sciences” (like mathematics or logics or game theory, chaos theory etc.) have to be identified as special types of interdisciplinary approaches as done before in our diagram of the types of interdisciplinarity. The same is true for descriptive and historical disciplines as well as linguistic research areas between the perspective traditional borderlines of the natural sciences and, say, the linguistic disciplines. For instance, in the history of the development of language in the evolution of the primates and australopithecines we would find an example of such a mixture of different approaches from very diverse school and faculties. The traditional separatism has to be rejected. It is methodological speaking false and also not only outdated by practice but also rather skewed by ideological leniences.

This is also true I think for the traditional distinction between “understanding” (“Verstehen”) and “explaining” (“Erklären”). Who would say that natural scientists only explain but don’t understand anything – or the other way around that humanities would only “understand” but “explain” nothing. This is senseless. Instead, it is possible to go beyond this dichotomisation by an entering on or ascending to a higher meta-level. It is time to bridge these cleavages and allegedly absolute distinctions and differentiations between the different methodologies in order to come to a certain kind of basic, if higher-level union.

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

IV. Towards a systematic scheme-interpretationism

Any sort of cognition, perception and action is necessarily shaped by (re)activation of "schemata". Any interpretation is schema (re)activation. Schemata are epistemologically speaking "structural" activation patterns which 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, shapes and constructs 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 schema 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 schemata. This connection might be characterized by core features and core stimuli the selection of which is necessary, even though some of these are conducted 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.

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 structure. Any recognizing and generalising, particular conceptual knowledge is thus bound to cognitive schemata which 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 or constituting objects, processes, events etc. 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*), which 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). 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.

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 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). 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 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), "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 (1978) compares the concept, role, activation and function of a schema with similar concepts of structured activities: for example, schemata are 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 schemata and sub-schemes in a certain hierarchical architecture and that schemata have variables connected with different aspects of the environment and the diverse instantiations of the schema. For instance, the schema BUYING admits of the functional roles and schemata of BUYER and SELLER as well as the media MONEY and GOODS as well as the subschema BARGAINING. The instantiation of such a schema 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 however are more abstract and general than a drama or its plot and script. Schemata may be applied to things, objects, shapes and events as well as any spatial, static or functional relationships and constellations.

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 schema 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. The encompassing set of the schemata we use to interpret our world would represent and comprise in a sense our "private theory" (Rumelhart 1978) of the nature of reality. Schemata represent or mirror so to speak our internal models of the

respective situations in the world: Methodologically speaking, (schema) interpretation is but the (re)activation of schemata. 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 schemata. The mutual activation of schemata and sub-schemata 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 information manipulation.

As Kant had already recognized, 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. 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 it by frames, concepts, orders, unifications, configurations etc. *Interpretation* is indeed the development, stabilization and *activation* (application) of mentally representing constructs or schemata. 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 schemata by using procedures of establishing, stabilizing and activating schemata as cognitive constructs in order to structure the respective world versions and sets of objects or events, structures, procedures as well as projections.

It is interesting that schema interpretation admits of levels of categorisation as well as 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. I developed a hierarchy of levels of interpretation consisting of six different levels or plains of interpretation. The following diagram shows the respective six levels:

Diagram of the Levels of interpretation²

IS₁: practically unchangeable productive primary interpretation

"Urinterpretation") (primary constitution or schematization, respectively)

IS₂: habit-shaping, (equal) forms-constituting pattern interpretation

(ontogenetically habitual(ized) form and schema categori(al)ization and

² The different levels of interpretation are the following ones: IS1 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 schemata 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 discussed by Piaget. Also comprised are the biologically hardwired primary theories which we cannot alter at will, but which we can (only) problematise 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 IS2 we have the habitual, quality forming frame interpretations and schema categorisations as well as "categorialisations" 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 IS3 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 (IS3a) on which pre-linguistic convention(alisation)s are characteristic. On the other hand (on IS3b) we have the explicitly linguistic conventionalization or the differentiation of concepts by means of language. - Level IS4 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 subsumtion. - Level IS5 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. - After all, we have also a level (**IS6**) 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 interpretationism is itself certainly an interpretative one and can be described scheme-interpretationism itself. One could call this a metalevel of interpretation and explicitly speak of epistemological meta-interpretations. However, this level is cumulative and open towards further meta-levels.

preverbal concept-formation)

IS₃: conventional concept formation transmitted by social, cultural and norm-regulated tradition

IS_{3a}: ... by non-verbal cultural gestures, rules, norms, forms, conventions, implicit communicative symbols

IS_{3b}: ... by verbal forms and explicitly representing communicative symbols, metasymbols, metaschemata etc.

IS₄: applied, consciously shaped and accepted as well as transmitted classificatory interpretation (classification, subsumption, description by "sortals", generic formation of kinds, directed concept-formation)

IS₅: explanatory and in the narrow sense "comprehending" ("verstehende"), justifying, theoretically or argumentatively substantiating interpretation, justificatory interpretation

IS₆: epistemological (methodological) metainterpretation (plus meta-meta-interpretation etc.) of methods, results, instruments, conception of establishing and analysing interpretative constructs themselves.

The model and approach of epistemological and developed only on a certain respective meta-level which is to be seen within the level **IS₆**. Therefore, we have the possibility of a self-application of the interpretational method to interpretative procedures itself.

The philosophy of schema interpretation is a philosophy of interpretative constructs as an epistemological model which admits of a certain kind of meta-theoretical and meta-semantical self-application in the form of a sort of "meta-interpretation". This is certainly an asset and epistemological advantage compared to a few other epistemological approaches including critical rationalism after Popper, a theory which does not admit and conceive of the precise conditions of being falsified itself. The human being is indeed the "meta-interpreting being" (cf. my 1955), capable of ascending to ever higher meta-levels of (scheme-)interpretation.

To be sure, in our cognition, even in all actions and behaviour of any kind we are indeed obliged to follow or use patterns, structures, frames, forms, shapes, scripts, and constructs as well as schemata or schemes. This holds true for all sorts of grasping any objects, whether concrete or abstract ones, maybe by recognition and

categorization or by normative interpretation or planned acting. Applications of schemes are schematizations or schema interpretations as I would like to label these interpretative constructs and their activation. They are to be distinguished from the usual text interpretation in hermeneutics. Schemata are used consciously, or they are frequently activated subconsciously. Any "interpretation" is based on or bound to such activations of schemata. 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. The schemes are 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.

Schemes are activated on a psychological, including the neuropsychological, level as well as on neuro-physiological or neurobiological³ and even biochemical sublevels, mainly 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 approach⁴; more generally they may be modelled as

3 Interestingly enough, modern neuroscience is on the brink of giving 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" ("Hirnkonstrukte") (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 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 neurophysiological 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.

4 To note, Immanuel Kant, in his Critique of Pure Reason (B, 179f), used the concept of "schema" for epistemology by
Macintosh HD:Users:wengglez:Documents:From Wenceslao J. González:Varios Facultad, 82:Holanda 2009 Papers:Versión editada para el workshop:Hans Lenk Higher-level interdiscip.doc

methodological constructs.

Again, whenever we try to compose phenomena and the results of categorizing them under generic and generalizing perspectives, e. g. by using general or abstract 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. Whenever 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 (Gestalten⁵) or in the process of 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 recognition as well as knowledge, but also for actions, including kinds of “grasping”

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 had defined “the schema” as “a product of the power of imagination, which is not attending to individual images or imaginations, but towards the ‘unity’ of sensations and intuitions and the determination of sensuality”, which is - as Kant stated – “the imagination of a method to imagine according to a certain concept in an image rather than the image itself”: “Now, this imagination 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 indeed applied the term ‘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) – being “the transcendental schema”. This would be “but the pure synthesis, according to a rule of the unity following concepts in general ...” (category) (ibid. 181). “In fact, at the foundation of our pure sensual concepts there are not pictures of the objects, but schemata” (ibid. my translation). - Kant applied this procedure of coordination and therefore also the concept of schema also to “imaginative” and mental representation of any objects of any experience, 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 thus 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. He only should have extended this to actions, too.

⁵ 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 features which are retrievable from memory.

objects.

V. Interpretation and hermeneutics

What I said about schematisation, constituting and even construing 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. It 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 my 2004).

You may even, following Kant with his famous Slogan “Gedanken ohne Inhalt sind leer, Anschauungen ohne Begriffe sind blind“ (CPR 75, „Thoughts without content are vacant, intuitions without concepts are blind“), formulate a similar variation of that: Scheme-interpretations without activation, without interactions and even interventions are vacant and interactions as well as interventions without scheme-interpretations are blind (see 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 might be also a bridge between the scientific approach of structuring by theories and concepts and everyday knowledge and structured actions, though at the price of a more abstract analysis and by descending to a higher meta-level. This is true also for the bridging between different sciences, e.g., the natural sciences and the social and human disciplines, in particular of the truly hermeneutical humanities. Methodologically speaking there is a unity or at most connection between the forms of knowledge if analysed on a higher meta-level which nevertheless allows some partial methodological differentiation or even separation between the disciplines to be bridged. (As we saw, methodological separatism is too superficial.)

The approach of schema-interpretation is a rather general, abstract 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 most diverse disciplines.

Certainly there are differences and incompatibilities below the abstract higher level unity or methodological parallelism. This is not to be denied. 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. or being accustomed to them.

An overarching common point of view is indeed, that science is also always 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 unity of the sciences is 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 using models of a higher level. In so far you can say that scheme-interpretationism is a higher-level bridge between the allegedly separated “science cultures” à la Snow as well as between cognition and action. It may resume and reinstall a higher-level unity between the different polarities. This seems to be the main message and may even be exemplified with regard to the history of hermeneutics and the respective humanities.

Traditionally it is true that even in the history of hermeneutics a sort of perspectivism was emphasized.⁶ The 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”,

⁶ Already 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 literaturally 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 “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.

Schleiermacher 1977, 443ff, 29) within a language community.⁷

This constructive element is even more explicitly emphasized by Dilthey: Like Schleiermacher he talks about the 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 totally convinced that any constitution is constructive and that interpretation is a constructive activity of the acting subject.⁸ This is parallel exactly to the above-mentioned analytic and 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 (“*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 central idea of the later Wittgenstein is that meanings are to be reduced or at least necessarily combined with us(ag)es of actions, patterns, i.e. rule-confirming sorts of schematized patternings – developments which might be captured by the concept of “pragmatizing” semiotics and semantics as well as “functionalizing” and somehow “socializing” meaning (see my 1998, chap. 7, 2001a, chap. 14). Its 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 activistic. 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.

⁷ Herder (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 seems to obfuscate these insights a bit.

⁸ Dilthey rightly criticizes Kant to the effect that the latter had only seen categorization as a problem of pure knowledge, i.e. of the application of the pure forms of the understanding (“*Kategorien*”). Instead, Dilthey 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.

VI. From the “Two Cultures” towards a reunification on interpretative metalevels

In general we have seen, that the methodological approach of interpretation constructs or the approach of methodological scheme-interpretationism would offer an instrument or way to see interdisciplinary relationships in the sciences and humanities as well as their conceptual procedures by representing symbolic activity under a certain kind of unified perspective, though on a higher meta-level, as a rather abstract, formally unifying methodological activity of the sciences and humanities under the overall approach of schematizations, scheme-interpretations and (reality-bound) impregnations of knowledge and action. This sort of a doubly supra- and interdisciplinary format is certainly highly relevant for the humanities and their relationship to the social and natural sciences.

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

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 unbridgeability 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 there is a certain more abstract, higher level epistemological approach being capable of bridging the separation the different disciplines, indeed on a higher level. The “bridge” is provided by the conception of constructive interpretation or scheme-interpretation and 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 symbols or quasi symbolic representations as well in everyday activities as also in the sciences and humanities.

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. 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 institutionalisation 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 contra-distinction, figure as a specific 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, “graspings” and actions are impregnated or bound by 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 their respective theories. Even in neuro-physiological terms this might be understood as the activation of neocortical and sub-cortical networks (neuronal assemblies) being a sort of biologically instantiated scheme 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 constructionism 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.

At first these present scheme-interpretation constructive approach was conceived as a methodological proposal. However it can also be analyzed in a quasi Kantian traditional epistemology as a Kantian transcendental interpretationism (see my 1993, 2003). Beyond that and even beyond Cassirer this approach has to be expanded towards an anthropology of the meta-interpreting being (my 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 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 characterizes the human being as the meta-interpreting being (cf. my 1995c, 2008a and b, 2009).

Epistemologically 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 some sense traditional hermeneutics of understanding has developed a certainly fruitful and indispensable approach as regards some methodological interpretative rules (usages and presuppositions of (re)interpretation of texts). This is the kind of hermeneutical methodology being a rather special case of our wider and comprehensive interpretation-constructivist approach.⁹ In particular, traditional hermeneutics as well as universal hermeneutics did not succeed in involving the schematizing activities on a neuronal and biological (neuro-biological) basis providing the vehicles (neuronal correlates) of all symbolic-interpretative activities of the organism.

By contrast, modern brain research and neuro-biology did beyond any doubt underline and verify the fruitfulness of a model of scheme-developments and scheme-applications, be it in the primary interpretations of the sense perceptions and patterns like by biological instincts, drives and motivations, be it with respect to conventional, learned scheme-activations and stabilisations of a social and cultural provenance etc. 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 neuro-biological patternings of our actions and knowledge with those of symbolic and cultural conventional provenance under a sort of theoretical and meta-theoretical roof. In addition, the same is true of the combination of everyday knowledge, of any action and object constitution etc. under the general abstract methodological (or, if you wish, quasi-transcendental) perspective of scheme-interpretationism or interpretative constructivism of a nevertheless realist

⁹ Beyond that however, philosophical hermeneutics starting with Dilthey, but notably being forwarded by Heidegger and Gadamer as well as Blumenberg to have a certain kind of hermeneutic "shaping of the world" or rather representations of world and even 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). Universal hermeneutics was fixed to the rather repeated construction of text-interpretation and could only by and large open up towards an interpretational constitutionalism of a more general purview.

sort (see my 2003). We can thus find a certain reunification of epistemology and action theory and their relevant disciplines under a kind 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 and important result not only for the philosophy of the natural sciences but also of the social sciences and the humanities as well as for everyday life.

Literature

Abel, G.: *Interpretationswelten*. Frankfurt/M. 1993.

Ambrose–(Lazerowitz), A.: *Linguistic Approaches to Philosophical Problems*. In: *J. of Philosophy* 49, 1952.

Cassirer, E.: *Philosophie der symbolischen Formen*. 3 vols. (1923ff) Oxford (1923) 19562, Darmstadt 19562, 19777(II), 19644(III).

Cassirer, E.: *Essay on Man*, 1944. 2nd German translation: Frankfurt/M 1990.

Gehlen, A.: *Der Mensch*, 1940. Bonn 1971, quoted: 1962 ed.

Gehlen, A.: *Urmensch und Spätkultur*. Bonn 1956.

Goffman, E.: *Rahmen-Analyse*. Frankfurt/M. 1977 (Orig. 1974).

Kant, I.: *Kritik der reinen Vernunft*. 2. Ed. 1787. (CRP B) Hamburg 1956.

Lazerowitz, M.: *Studies in Metaphilosophy*. London – New York: Routledge & Kegan Paul 1964.

Lazerowitz, M.: „A Note on ‘Metaphilosophy’“. In: *Metaphilosophy* 1, 91ff 1970.

Lenk, H.: *Zwischen Wissenschaftstheorie und Sozialwissenschaft*. Frankfurt/M. 1986.

Lenk, H.: *Zwischen Sozialpsychologie und Sozialphilosophie*. Frankfurt/M. 1987.

Lenk, H.: *Zu einem methodologischen Interpretationskonstruktivismus*. In: *J. for General Philosophy of Science* 22 (1991), 283-302.

Lenk, H.: *Interpretationskonstrukte. Zur Kritik der interpretatorischen Vernunft*. Frankfurt/M.: 1993.

Lenk, H.: *Philosophie und Interpretation*. Frankfurt/M. 1993a.

Lenk, H.: *Toward a Systematic Interpretationism*. In: Stapleton, T. J. (Ed.): *The Question of Hermeneutics*. Dordrecht. 1994, 79-88.

Lenk, H.: *Schemaspiele*. Frankfurt/M. 1995.

- Lenk, H.: „Das metainterpretierende Wesen.“ In: *Allgemeine Zeitschr. für Philosophie* 20.1 (1995a), 39-47.
- Lenk H. : *Interpretation und Realitaet*. Frankfurt/M. 1995b.
- Lenk, H.: *Interpretationen und Imprägnationen*. In: Simon, J. (Ed.): *Orientierung in Zeichen*. Frankfurt 1997, 19-40.
- Lenk H.: *Grasping Reality: An interpretation-realistic epistemology*. New Jersey – London – Singapore – Hong Kong: World Scientific 2003.
- Malsburg, C. von der: „Am I Thinking Assemblies?“ In: Palm, G. – Aertson, A.(Eds.): *Brain Theory*. Heidelberg – New York 1986, 161-176.
- Millikan, R. G.: *Language, Thought, and Other Biological Categories*. Cambridge/MA1984.
- Minsky, M.: „Frame-System Theory.“ In: Schänk, R. C. – Nash-Weber, B. L. (Eds.): *Theoretical Issues in Natural Language Processing*. 1975. (reprinted in: Johnson-Laird, P. N. – Wason, P. C. (Eds.): *Thinking*. Cambridge 1977.
- Neisser, U.: *Cognitive Psychology*. New York: 1966.
- Neisser, U.: *Cognition and Reality*. New York 1976.
- Plessner, H.: *Die Stufen des Organischen und der Mensch*, 1928. Berlin – New York 19873.
- Rakic, P. – Singer, W. (Eds.): *Neurobiology of Neocortex*. Chichester: 1988.
- Reese W. L.: „Morris Lazerowitz and Metaphilosophy.“ In: *Metaphilosophy* 21, 1990, 28-42
- Roth, G.: *Kognition: die Entstehung von Bedeutung im Gehirn*. In: Krohn, W. – Küppers, G. (Eds.): *Emergenz*. Frankfurt/M. 1992, 104-133.
- Roth, G.: *Das Gehirn und seine Wirklichkeit*. Frankfurt/M. 1994.
- Rumelhart, D. E., *Schemata: The Building Blocks of Cognition*. Center for Human Information Processing, University of California, San-Diego-La Jolla, quoted after CHIP-Report 79, 1978 (also in Spiro, R. – Bruce, B. – Brewer, W. (Hg.): *Theoretical Issues in Reading Comprehension*. Hillsdale NJ 1980).
- Schank, R. C. – Abelson, R.: *Scripts, Plans, Goals, and Understanding*. Hillsdale NJ 1977.
- Singer, W. (Ed.): *Gehirn und Kognition*. Spektrum der Wissenschaft 1990.