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Towards a Geometry of Basic Concepts*

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The essential pillars of man's thinking and knowing are the basic concepts which structure all his knowledge so far attained and his future knowledge. It is, however, only with great difficulty that these basic concepts can be made accessible for everyone through conceptual clarification, definition and classification. Here, geometrical forms and shapes are used as instruments for a proper representation of interrelationships of such concepts. This approach is supported by a fourfold way of reasoning concerning (1) basic questions of structuralization, (2) the problem of definition and defining, (3) the question of cognition and the standpoints of attaining cognitive knowledge and (4) the problem of classification of such concepts. The figures, tables and charts added display the methods applied as well as the concepts clarified in this way. The Epilog summarizes the four approaches and shows their practical implications.

I.C.

0. Introduction

In the attempt to encompass my theme, I can – in the shortness of time and space here – give only a brief overview of the main aspects of this question-complex without aiming at an exhaustive description. However, I will try to do this in a clearly segmented and systematic manner, for he, who undertakes an excursion into the field of basic concepts, is well reminded to begin gradually and to reason on each step and on each central concept that arises. Therefore, I would like to start off first with some basic questions concerning structuralization, since order (as the aim, process, product of structuring) is in itself the central theme of 'classification'. Furthermore, I will try to probe into the problem of definition and defining from a side which is of importance for the question of general concepts, and after looking from a quite general viewpoint at the question of cognition and the standpoints of attaining cognitive knowledge, I will go over to the problem of a classification of basic concepts.

I would like to ask for a very unpreconceived approach towards my partially maybe, somewhat unusual exposition.

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1.0 General remarks on the question of order

The concept of 'order' is one of the fundamental concepts of our cognition; were I to try to give a formalized concept-analysis here, I would have to presuppose a large part of what I would like to state in this paper. Therefore I would prefer to start off in calling for four central momenta of this concept and in trying to grasp it by the use of these. These momenta are unifoldness ("Einfachheit" = unity, uniformity, simplicity), hierarchy, synergy and concordance, whereby unifoldness will be the leading motif of this part of my exposition.[1]

1.1 Order as unifoldness

Unfoldness is the prime principle of order. Without unifoldness any attempt at ordering would be unoverviewable. Unifoldness therefore is the guarantee for keeping an overview in the step-by-step development of ordering, in the step-by-step creation of order.

In giving a guarantee for overviewability, unifoldness becomes the factor which creates the clarity and transparency in the undertaking of order. Clarity and transparency are, however, the pillars that carry each and every order. Therefore unifoldness can also be seen as the guarantee for the inner stability of a framework of order. Without stability no foundation will be efficient, no construction will be capable of supporting.

But what *is* unifoldness: As remarked in the introduction this cannot be the place to answer this question exhaustively,[2] but at least the essence, the essential characteristics can be stated:

The essential characteristic of unifoldness is that the diversity of the parts of a whole are bridged by the closeness of their association and moulded into unity. [3]

The essence of unifoldness therefore lies not so much in total unity but rather in unifold totality which arises from the lessening of inner diversity.

Absolute unifoldness is therefore identical with total diverselessness.[4]

1.2 Order as hierarchy

If unifoldness can be seen as the constitutive, propulsive component of order, hierarchy on the other hand is the separative, distributive component. *Hierarchy organizes order.*

Hierarchy guarantees the adaptability of an ordered whole by introducing diversity, oppositions into the framework of order.[5]

The essence of hierarchy, therefore, is the combination of diverse, oppositional components into the form of a dimensional complex.[6]

In combining oppositional elements, hierarchy creates differentiation, separability, localizability and *defineability* in the ordered whole.

Total hierarchy secures thereby complete differentiation and defineability of its parts.

1.3 Order as synergy

Synergy is the dynamic aspect of hierarchy. The static dimensionalization of an order-context becomes dynamic function. Synergy brings organzation into function.

To the distributive component is added an associative movement.[7] The plurality of hierarchical oppositions which enable external adaptation are harmonized by internal exchange.

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Table I: Principles of order

	Unifoldness	Hierarchy	Synergy	Concordance
structure	overviewability, clarity, transparence	organization, diversification	self-regulation, harmonization	self-assurement compactness
goal	formal stability	dimensional adaptability	functional regeneration	substantial growth
function	constitutive, propulsive	seperative, distributive	associative, propagative	shape-giving, integrative
essence	unifold totality	linkage of diversities	actualization of possibilities	wholesome unity
absolute criterion	diverselessness	specification	completion	utilization

Synergy endows the order-totality with the ability of self-regulation, thus acting proagatively. In the process of combined exchange of energy ('synergy') of organized order-complexes, follows a representation of order structures into and onto each other, which enables the system to regenerate.

The essence of synergy therefore is functional self-regulation.[8]

By synergy the potentially existing possibilities within a hierarchical context become actualized.

Total synergy therefore secures completeness of the structural potential lying in an ordered whole.

1.4 Order as concordance

Concordance is, so-to-speak, the dynamic aspect of unifoldness. Concordance is the integration of a plurality of functions to form a whole. The compactness of an ordered whole follows from it.

If hierarchy quantifies the prime principle of unifoldness and if furthermore synergy relationizes the former, then concordance qualifies the latter. If unifoldness gives the primary form, then hierarchy dimensionalizes it, while synergy functionalizes the former and concordance substantializes the latter.

If unifoldness is the propelling power, concordance is the concluding *Gestalt*. With concordance the value of order is revealed; though the other components are presupposed the ordered whole is concluded by it.[9]

The essence of concordance is self-assurance of the ordered whole, which allows it in turn to grow.[10]

Concordance is therefore the wholesome unity of an ordered totality. As such utility and validity of a framework of order is secured beyond the limits of immanence.

Absolute concordance secures maximal utilization.

1.5 Order as a geometrical task

From the points mentioned the fourfoldness of order can be derived[11] as well as the strong interconnection between the differing aspects, their interpenetration and the necessity to integrate them to forman ordered whole.

This task can only be accomplished in an uncomplicated manner by the use of a geometrical approach.[12] In this, unifoldness gives the structural principles, hierarchy the dimensional degree, synergy the nettedness (Vernetztheit) and concordance the compactness and elegance of a geometrical solution to a task of ordering. A geometrical approach has the advantage of making complicated contexts transparent and overviewable without many words; furthermore of enabling work from different sides towards the realization of an order: form the elements as well as from the whole, from the differences as well as from the mutualities.

In the course of this paper this approach will be used as a means to come to an expanded understanding of the praxis of defining, that is the localization and differentiation of concepts; to form a survey of the basic factors in cognition; and finally to achieve a classification of basic concepts.[13]

2.0 General remarks concerning the question of definition

Defining means striving for a better differentiation of the one from the other. Attention here is laid upon separation, upon diversification. In the practice of defining this task is of no great difficulty as long as diversity is strong in the material to be defined. I am thinking of special and individual subjects, respectively concepts thereof. Already with general subjects, we face difficulties, but especially with basic concepts and categorial concepts.

Therefore, I should like to try – after a brief exposition of definitorial elements and the normal-type of definition of the common kind[14] – to present a method for the clarification of concepts and to introduce possiblities of geometrical visualization. The leading motif in this part shall be hierarchy, that is, growing dimensional segmentation.

2.1 Definitional elements

Let's look at the following Table II.

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Table II: Definitional elements

		direct	concrete	abstract
	area	individual-	special-	general
	limited by:	time, space position	space, position	position
word	subject (def'dum)	individual subject (thing)	special subject (fact)	general subject (theme)
statement	represented by:	name	term	designation
	attribute (diff. spec.)	properties	characteristics	connectives
(definit.) phrase	object (genus prox.)	kind	field	ground

The subject of a definition may be of individual, special or general kind. They differ in that the individual subject, which I would like to call "thing", is limited by time, space and position, whereby time, history, is the essential aspect; furthermore that the special subject which I would like to call "fact", is limited by space and position, whereby space, extension or location is the essential aspect; finally that the general subject, which I would like to call "theme", is only limited by position (that is arrangement, direction, situation in connection to other general subjects).

The general subject is always an abstract one, the special is abstract or concrete, the individual abstract, concrete or direct.

The instruments for defining are word, statement and (definitional) phrase. The word calls for the subject, that is the individual, by a name, the special by a term and the general by a designation. The statement allocates attributes to a subject, that is properties to an individual, characteristics to a special and connectives to a general subject. In the (definitional) phrase these are interrelated with an object, that is, with kind, field and ground.

If an individual subject be given directly, a name sufficies to differentiate it (if this is connected with a deictical impulse). On the other hand, if it is given only concretely, just as the special subject, then relevant statements which attribute properties, resp. characteristics to the name, resp. the term are necessary to differentiate it. If the individual or special subject is given merely abstractly, as it is the case with general subjects, then a (definitional) phrase is needed, which interrelates the definiendum (thing, fact, theme) as the subject with a genus proximum (kind, field, ground) as the object and one or more differentiae specificae (property, characteristic, connective) as attribute(s) in order to differentiate it.

2.2 The normal-type definition

As can easily be recognized a (definitional) phrase is always needed to encompass a concept at the conceptual level, which is the abstract one. If the concept is to be *constituted* by it, certain requirements are to be posed for the diff. spec. which are usually called "essential and necessary" characteristics, which are to be selected from the multitude of those possible. The concept-constituting definition can be visualized in the following manner: (Fig. 1)

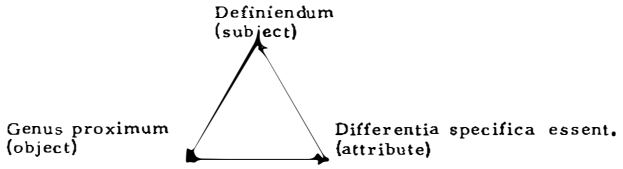


Fig. 1: Definitional triangle

Depending on whether the concept is a general, special or individual one (as an abstraction of such a subject), resp. whether elements of an abstract subject as its designation or connectives – which being likewise on the abstract level enter into such a constitutive type of definition – are envisaged, the various momenta move to their positions in this definitional triangle, which thereby maintains its structure: the definiendum is defined by the relation of gen. prox. and diff. spec. essent.[15]

It is quite easy to establish the essential and necessary characteristics for individual and special subjects, with general subjects, on the other hand, problems arise and they grow move intense, the more complex these become.

2.3 The clarification of concepts

If we analyze the dimensional segmentation so far, we arrive at the following figure:

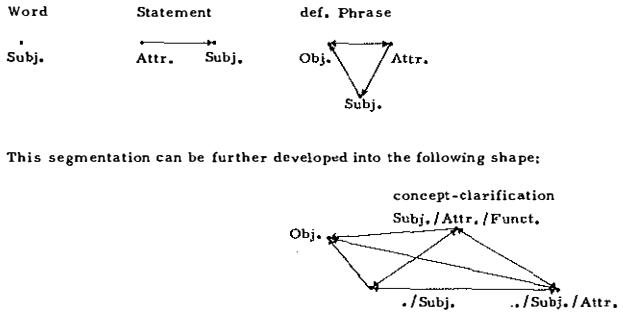
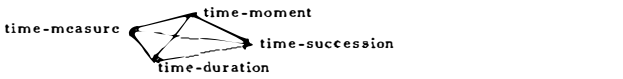


Fig. 2: Dimensional segmentation of the types of definition

In the place of the simple relation betweeen gen. prox. and diff. spec., which explained the definiendum in the definitional phrase, here we may face a threefold relation between concepts at the same level of abstraction subsumed to a concept of a higher level which can be segmented into those,[16] for example:



The three concepts of the same level of abstraction clarify eachother:

'Time-moment' (subj.) is a time-measure (obj.) which is given by the time-duration (attr.) in a time-succession (funct.).

'Time-succession' (subj.) is a time-measure (obj.) which is given by the time-moments (attr.) in a time-duration (funct.).

'Time-duration' (subj.) is a time-measure (obj.) which is given by the time-succession (attr.) in a time-moment (funct.).

Fig. 3a: Example for a concept-clarification

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This segmentation can be further developed in just the same manner:[17]

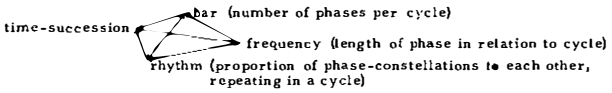

Fig. 3b: Example for a concept-clarification, cont'd

What we get here is a *concept-clarification*, in which the participating concepts are not defined by a definitional phrase but clarified by themselves in their geometrical constellation, which is expressed by number[18] and relatedness of the components.

Function appears hereby as a further element besides subject, object and attribute, but it is the iterative alternation of function, subject and attribute which builds up the threefold relation.

This method can be used to create order in the region of highly general and extremely general categorial and metacategorial concepts and to generate thereby a true clarification of concepts.

2.4 Clarification of complex-concepts by geometricalized concept-complexes

I would like to call these concepts which generally are outside the span of a normal definition "complex-concepts". The possibilities of presenting them in a geometrical manner by an ordered whole of their conceptual parts are manifold. Also, the process of a triadic concept-clarification expels the concept out of its linear appearance in the phrase and propels it into the plane which calls for the use of three-dimensional patterns of order for their presentation. The tetrahedron for example is such a pattern. There exists a large number of such bodies of which some, due to their specific properties, are suited to the representation of complex concepts, which would need a higher level of complexity than the three-dimensional ones.

But it is also possible to recall the advantages of such 3-d clarifications back into the plane by creating highly symmetrical circular constellations which are capable of expressing the special inner validity of the connectives in such a concept-complex.

As an example Chart I shows such a 'concept-mandala' which enhances the properties of a tretravalent-logical structure,[19] that is composed out of a conceptual tetrade which in turn segments into four conceptual triads and six conceptual dualities.

This conceptual tetrade is the transposition of an equivalent clarification tetrahedron and shows the essential category of structural being by means of the four metacategories of dimension, function, substance and form into twelve general categories of cognition.[20]

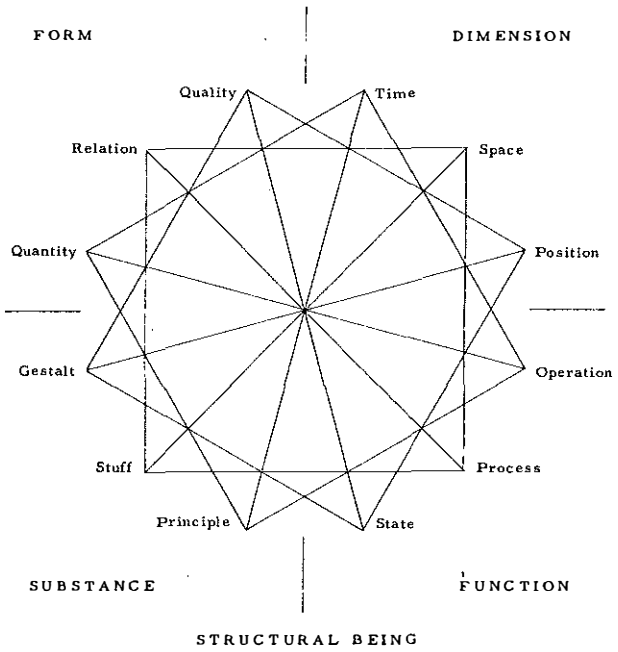

Chart I: Tetravalent clarification of the essential category of structural being by means of the four metacategories. of dimension, function, substance and form into twelve general categories of cognition.

2.5 Dimensionalization of conceptuality and dimensionaliziation of reality

From what has been said, the possible dimensionalization of conceptuality by progressinly higher concept-complexes can be seen. One could speak in this context also of a clarification of 0^{ro}, 1^{st}, 2^{nd}, 3^{rd} etc. order. Once the complex-concepts which are represented by such concept-complexes are sufficiently established it is likely that it will be possible to refine further the method of concept-localization in the spoken phrase in the sense of a definition of 2^{nd}, 3^{rd} etc. order.

What remains questionable is whether there is a real utility here beyond the mere transparency of conceptual constructs. This question refers us to the region of cognition-theory. After all, physical reality seems to possess a four-dimensional structure – at least since Einstein – and recent investigations[21] seem to indicate that this limit can be pushed up to even six dimensions.

An adequate handling of such a complex reality can only be expected by a similarily demanding concept-pattern. This, however, presupposes naturally a mind, which is tremendously free and unbounded in its function and which can allow itself to move beyond the limits of bivalent logic along higher valented paths of cognition.

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3.0 General remarks concerning the question of cognition

If one wants to relate the already exposed concept of order with that of cognition, one could formulate that *order is the strategy of cognition.*

But this only touches the structural aspect of cognition. Definition as a method of localization of subjects of cognition on the other hand serves the finality of cognition.

But what is the driving force which initiates the process of cognition?: we shall now try to look at this question.

Cognition shall be exemplified in the following by its character as a dynamic realization of the interaction of the knower and the known, as linkage and guarantee of reality, in its diverse relatedness and finally its inner segmentation. The leading motif shall be synergy.

3.1 Subjectivity and objectivity

The problem, just how the subject of cognition is to be thought of as being in relation to the object of cognition is certainely not new. What has always caused difficulties is the question of how the separately understood regions of the subject and the object of cognition may touch, or even unite, in the process of cognition. Differing solutions which lead to the differing positions of thought, regulations of speech, maxims of action, have been suggested. The throughgoing rupture between the humanities and natural sciences has its origin in the preunderstanding of separatedness of subject and object of cognition.

Now what can be undertaken from the approach presented to come to a clarification of this question?

The attempt to clarify the question of cognition is but a process of achieving cognition on the process of achieving cognition. The principles or order as strategy for the achievement of cognition have their primal right and that calls for the prime principle of unifoldness (unity-uniformity-simplicity) which obtains the pride of place in this consideration. Cognition on cognition therefore begins at the point of highest possible unifoldness, which, as we already established, is characterized by total diverselessness.

If the human organ of cognition wants to collect cognitive knowledge on the process of cognition, it has to give itself over to a state of diverselessness. How this is to be undertaken has been explained repeatedly in recent times.[22]

The state of diverselessness of the organ of cognition, which at the same time is its simplest, most fundamental and primary state *does not know of any diversity between the subject and object of cognition.*[23]

This has lasting consequences for a theory of cognition.

3.2 Man, Nature and cognition

For the explication of the process of cognition in the mode of concept-clarification – as exposed above – I would like to set-up three phrases that apparently contain a circle but which, in considering the above circumstances, are capable of giving a clarification.

Nature is the outer reality of Man.

Man is the inner reality of Nature.

A momentum of cognition represents a momentum of correspondence between these two regions.

Fig. 4: Cognition, Man and Nature

Cognition is thus correspondence between Nature and Man. Total cognition therefore signifies total correspondence between Nature and Man, meaning in addition their identity. Lack of cognition causes Nature and Man to appear separated.

Reality and cognition are directly connected to each other. With growing cognition the degree of reality is growing in the sense of compactness and wholeness of inner and outer reality.

The state of diverselessness is equivalent to total cognition, total correspondence and total reality. Its "place" is the inner reality of Man and the outer reality of Nature.

Considering this, there are differing paths to total cognition.

3.3 The paths of cognition

Fourfold are the paths of cognition.

One path is leading from the outer reality of Man into the outer reality of Nature. It is the path of science.

One path is leading from the inner reality of Nature into the inner reality of Man. It is the path of religion.

One path is leading from the inner reality of Nature into the outer reality of Man. It is the path of art.

One path is leading from the outer reality of Man into the inner reality of Nature. It is the path of philosophy.

Science, religion, art and philosophy are the paths of cognition. They differ in direction and in the way and means of their progression, but not in their goal. Their goal is complete cognition, which science strives for in the outermost reality of nature, religion in the innermost reality of man, art in the creative linkage of Man and Nature and philosophy in the receptive linkage of Nature and Man.

3.4 The inner segmentation of the paths of cognition

Each path may be segmented threefold: thought, speech and action work as instruments for the achievement of cognition.

scientific	thought	is	distinguishing
"	speech	is	describing
"	action	is	testing
religious	thought	is	surrendering
"	speech	is	interlinking
"	action	is	experiencing
artistic	thought	is	imagining
"	speech	is	comprehending
"	action	is	creating
philosophic	thought	is	inquiring
"	speech	is	comparing
"	action	is	clarifying

Fig. 5: Cognitive acts segmenting into thought, speech and action

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Table III: Cognitive acts

	DISTINGUISHING	Distinction, Discernment, Differentiation
Science	DESCRIBING	Abstraction
	TESTING	Judgement
	SURRENDERING	Memory, Inspiration
Religion	INTERLINKING	Sythesizeability, Integration
	EXPERIENCING	Perception, Ability of Impression
	IMAGINING	Imagination, Inventiveness
Art	COMPREHENDING	Comprehension, Sense of Wholeness
	CREATING	Creativity, Productivity
	INQUIRING	Intuition
Philosophy	COMPARING	Comparison, Sense of Analogy
	CLARIFYING	Exposition, Ability of Expressing

In Table III these concepts are listed and explained with various nomenclatures for cognitive acts.

The structure of this concept-complex is again tetravalent, consisting of four triads – the four paths of cognition – and six dualities – the diametrically opposed cognitive acts.

In their activity they are antagonistic as well as complementary, in this reason lies the significance of their complete development.

3.5 On complete cognition

In order not only to achieve complete cognition, but also to make it available by mediation and presentation, it is most necessary that all of these cognitive activities are working together in a concordant manner in the organ of cognition.

Unfortunately the efforts which are made in our educational institutions still concentrate upon imparting knowledge in terms of *facts,* instead of focussing their attention on developing the existing potentialities in the organ of cognition.

A fully developed organ of cognition, which is capable of integrating the cognitive activities mentioned above into a unity, has no essential need for any predigested data in order to reach a fruitful cognitive activity. On the other hand, an organ of cognition which does not have the full development of its inner potentialities at its disposal, is hindered in its activity and even a great amount of data and other material will not be able to change anything in this. The structural question is the primordial one here and the primordial structure is the one which structures itself, that is, which is its own foundation. Therefore, complete cognition is only possible with a thorough-going unifoldness, that is diverselessness of its foundation; with a universal orientation of its directedness, including differentiation of its methods; with a uniform development of its segments, keeping thereby the diverse aspects of reception and viewpoints of cognition; and finally, with complete relatedness to a synthesizing source by integration of its activity to the consciousness of its reality.

4.0 General remarks on the question of a classification of basic concepts

In the context mentioned above, the basic concepts naturally play a main role, since they do not only express cognitive contexts, but also serve as leading points along which cognition unfolds.

In forming a classification of basic concepts it is therefore necessary to proceed in such a manner as to secure that this classification will provide an egg cell for further classificatory growth. This can only be reached by means of a correspondingly high degree of concordance.

Concordance therefore will be the leading motif of this part of the paper, whereby first the basic concepts of structural being will be envisaged in connection with the problem of standpoint, followed by the basic concepts of finale being together with a consideration of the problem of the general segmentation of a classification of basic concepts, followed by a presentation of the basic concepts of causale being with a look at the problem of the combinability of basic concepts and finally, the display of the basic concepts of material being in connection with the problem of expansion of basic concepts.

I will try to present a classification of the basic concepts in the form of a fourfold tetra-valented concept clarification.

4.1 Basic concepts of structural being – the problem of standpoint

The basic concepts of structural being mentioned above (Chart I) form the structure in the totality of cognition along which the single components can grow to unifold totality.

The clarification of structural being in the form of the tetrade of metacategories of substance, form, dimension and function is further segmented by a clarification of the metacategories in triads, so that the clarification of the metacategory of

substance follows by means of principle, stuff and gestalt,
form follows by means of quantity, relation and quality,
dimension by means of time, space, and position,
function by means of operation, process and state.[24]

In this constellation we see that certain symmetry-opposition, resp. analogy-relations exist along the outlined axes, so e.g. between

principle, quantity, time, operation
stuff, relation, space, process,
gestalt, quality, position, state.

The mode of succession is not completely deliberate,[25] but one should note a quite general problem here which arises within a classification of basic concepts: it is the problem of standpoint, from which a classification proceeds. From this follows that a uniform state of affairs may be expressed in diverse patterns and ways of constellation by projection onto differing points of view. In the past this has probably caused a lot of confusion.

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The problem is solved in that, in a clarification of a complex-concept in the form of a concept-complex, the different possible points of view are already prestructured by the diverse components and in that they are projecting themselves on themselves in the further formation. The further clarification of the 12 categories of structural being therefore is partitioned in twelvefold manner, so that 144 positions arise. Hereby the categories are looked at in each case under an aspect of themselves. If we look at the categories of structural being, e.g. under the aspect of principle, which aspect carries in itself the principles of the conceptual clarification of the other aspects of projection, we come to the following constellation (Table IV), whereby the diverse positions are clarified by conceptual triads.

Table IV: Segmentation of the categories of structural being as seen from the position of the category 'principle' in the mode of a triadic concept-clarification

PRINCIPLE			
Principle	elemental	interal	total
Stuff	active	movable	static
Gestalt	discrete	proportionate	continuous
Quantity	uniform	multiform	omniform
Relation	affective	partitive	combinatory
Quality	sensitive	associative	valuative
Time	mutative	iterative	permanent
Space	locative	figurative	dimensionalized
Position	prepositional	directional	compositional
Operation	progressive	successive	possessive
Process	dynamic	latent	consistent
State	radiative	immanent	consumptive

The aspect of principle projected upon principle itself brings about the general structural principle 'elemental-interal-total' for the clarification within the diverse components.[26]

4.2 Basic concepts of finale being – the problem of segmentation

The basic concepts of finale being build up the goals in the totality of cognition onto which cognition is focussed – meaning, the products of cognition are adressed here.

This leads to the general problem of presentation of basic concepts of cognition as a fact of cognition. But the following elements enter into submission of cognition: subject of cognition, object of cognition, attribute of cognition and act of cognition.

The problem of a segmentation of basic concepts therefore will be solved by a fourfold segmentation of these according to attributive, subjective, productive and objective viewpoints. This is attained by a fourfold partition in basic concepts of structural (attributive), finale (subjective), causale (productive) and material (objective) being.[27]

In this segmentation, the finale being builds up the general foundation of the subjective components of cognition.[28] Within this, a clarification is created by applying the previously or considered viewpoints:

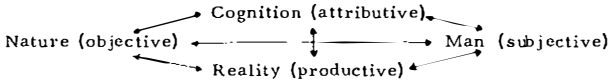

Fig. 6: Metacategories of finale being with aspects of segmentation

Further clarification can be undertaken by applying the prestructured structure-concepts of structural being. The first stage would show, e.g. the following finale concepts.[29] (Chart II)

4.3 Basic concepts of causale being – the problem of combination

The basic concepts of causale being call for the reasons in the totality of cognition, for which cognition comes into existence. The central moments are the cognitive acts which operate along the paths of cognition. The clarification of these, mentioned above, takes the following form. (Chart III)

If these activities are substantiated they become categories for the classification of diverse operational concepts in general (Table V).

Table V: Cognitive acts substantivated as categories for activity in general

Distinguishing	FORMATION	Imagining	CONCEPTION
Describing	RESEARCH	Comprehending	DEVELOPMENT
Testing	REALISATION	Creating	PRODUCTION
Surrendering	ORGANISATION	Inquiring	LEARNING
Interlinking	INTEGRATION	Comparing	DIALOGUE
Experiencing	RECEPTION	Clarifying	EXPLICATION

Here again, the aspect of interpenetration appears as exposed in the problem of viewpoint with the basic concepts of structural being, but in this case we face an operational character of this interpenetration. With the use of it the problem of combination of basic concepts for the presentation of contexts can be solved.

The operational character which unveils itself in the differentiated succession of cognitive acts can be used to create dynamic constructs out of the static constellations of clarified basic concepts which in turn will provide an instrumentalization of basic concepts as a device for *attaining* cognition.

In accordance with this, here one of 6 possible concordant operationalizations of the mentioned clarification of causale being is reproduced (Chart IV). If an operation of cognition is premissed as a threefold activity of thought, speech and action, 64 diverse cognitive operations can be deduced from this. However, on the whole, the structure of cognitive acts is 12-valent. This constitutes a potential of such a high degree that I would like just to mention it in passing (4096 diverse and partially very complex constellations).

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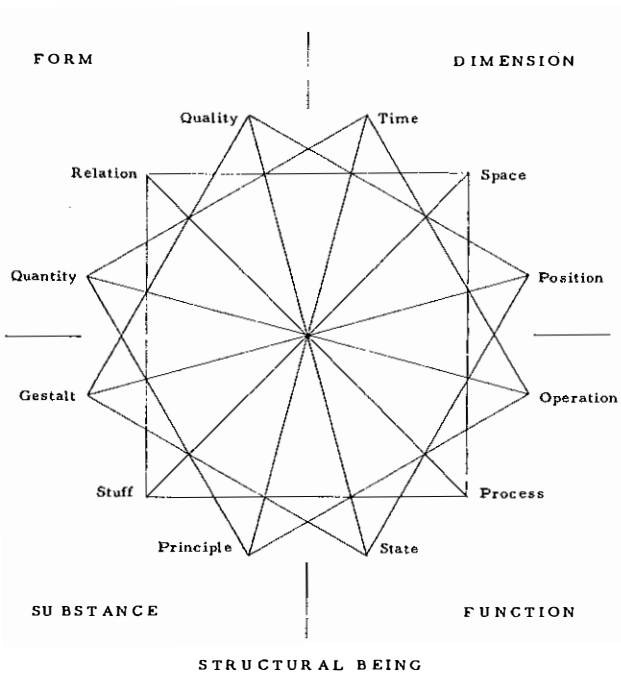
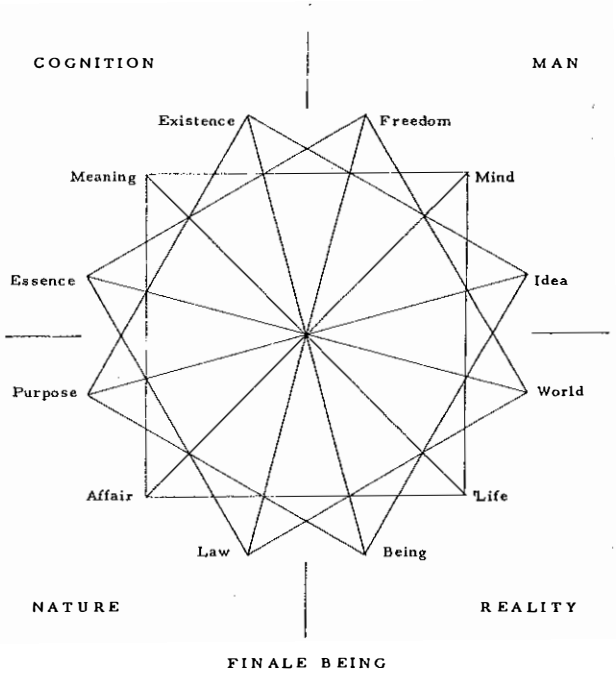


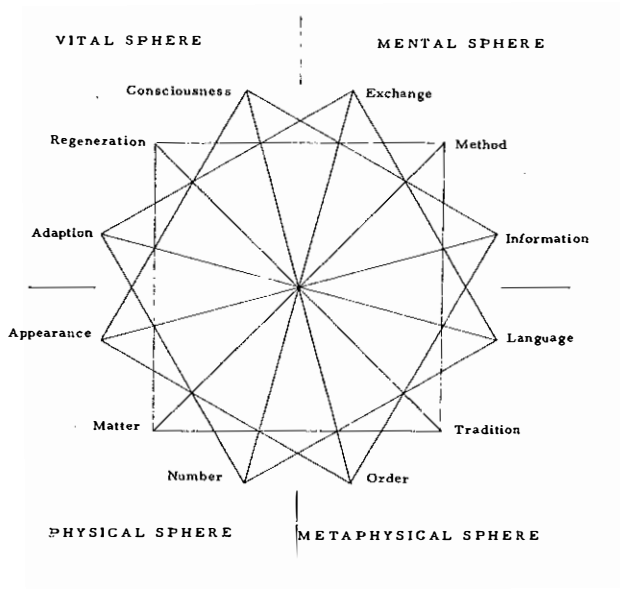
STRUCTURAL BEING

Chart I: Tetravalent clarification of the essential category of structural being by means of the four metacategories of dimension, function, substance and form into twelve general categories of cognition.



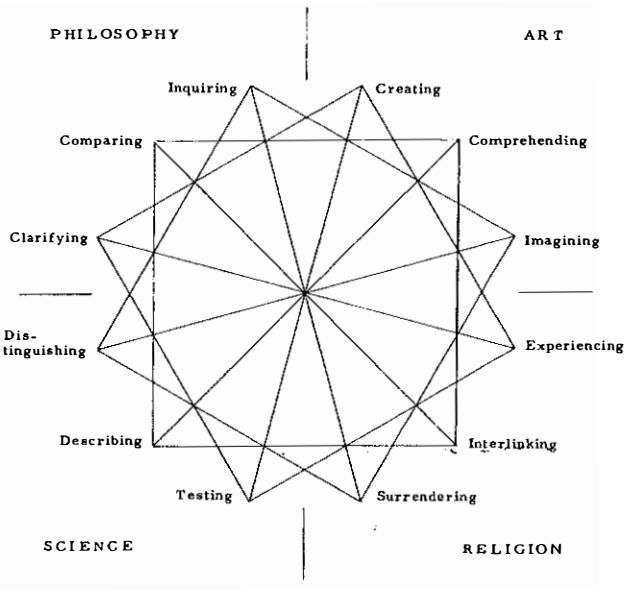
FINALE BEING

Chart II: Tetravalent clarification of the essential category of finale being by means of the fourness of Nature, Cognition, Man and Reality into the twelveness of general goals of cognition.



MATERIAL BEING

Chart V: Tetravalent clarification of the essential category of material being by means of the fourness of the physical, vital, mental and metaphysical sphere into the twelveness of general basic phenomena of the grounds of cognition.



CAUSALE BEING

Chart III: Tetravalent clarification of the essential category of causale being by means of the paths of cognition Science, Philosophy, Art and Religion into the twelveness of general cognitive acts.

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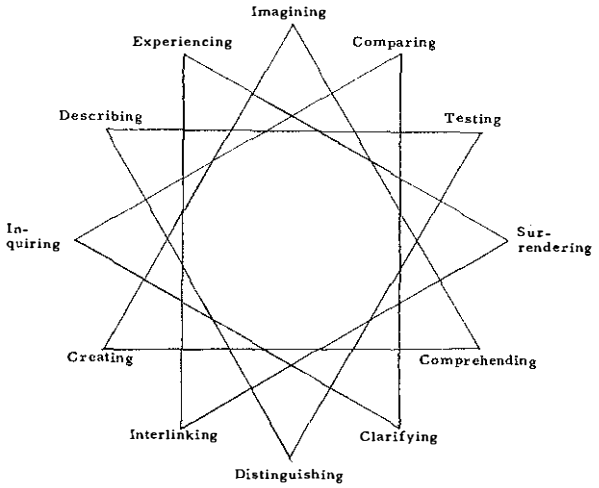

Chart IV: One of six possible concordant operationalizations of the cognitive acts
Note: If an operation of cognition is premissed as a threefold activity of thought, speech and action, from the above shown operationalization of cognitive acts e.g. the following operations of cognition may be derived: Clarifying/Comprehending/Surrendering; Experiencing/Describing/Inquiring; Distinguishing/Interlinking/Creating etc. etc.

4.4 Basic concepts of material being – the problem of expansion

Material being contains the objectively given components of cognition. As such, it covers the totality of the 'material of cognition', which segments into a physical and metaphysical sphere of reality, and a vital and mental sphere of cognition.

In claiming a hierarchical opposition of the vertical order these can be understood as:

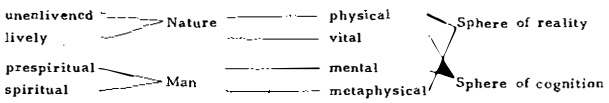

Fig. 8: Spheres of material being in relation to Nature and Man

In the further segmentation the material being can be surveyed as:

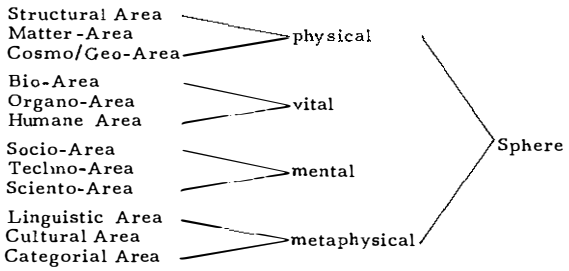

Fig. 9: Spheres of material being, segmented into areas of objective grounds of cognition

These areas span, so-to-speak, the space of activity in which the cognitive handling of the 'material of cognition' can be undertaken. But this can be undertaken from differing aspects,[30] whereby a reflection of the areas onto each other is meant justs as in the consideration of structural being. In Table VI these aspects are shown in correlation with their 'areas of origion', furthermore basic phenomena of the areas which further declare their subject and finally direct examples. The higher areas form, so-to-speak, the structural preconditions for the areas below, whilst these supply the material for the development of the upper ones.

As can be seen, the categorial area as the highest, closes the circle by interconnecting to the structural area, which is to be perceived in the clarification of the basic phenomena accordingly (Chart V). On the other hand, it can be seen likewise that the area of order thematized *here* can be developed in the process of cognition, just as the other areas from different standpoints with differing intentions of cognition and by the utilization of differing activities of cognition.

Table VI: Areas of material being

Aspect	Basic Phenomenon	Area	Examples	Sphere
mathematical	Number	STRUCTURAL-	measure, formula	PHYSICAL SPHERE
physical	Matter	MATTER-	force, atom	
morphological	Appearance	COSMO/GEO-	mineral, star	
biological	Adaption	BIO-	plant, cell	VITAL SPHERE
somatological	Regeneration	ORGANO-	animal, organ(ism)	
psychological	Consciousness	HUMANE-	man, feeling	
sociological	Exchange	SOCIO-	family, state	MENTAL SPHERE
technological	Method	TECHNO-	procedure, product (of trade)	
scientological	Information	SCIENTO-	theory, publication	
linguistical	Language	LINGUISTIC-	lyrics, music	METAPHYSICAL SPHERE
historical	Tradition	CULTURAL-	mythology, rites	
classificatory	Order	CATEGORIAL-	basic concepts, categories	

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Here we come to the problem of expansion of cognition, especially the cognition concerning basic concepts. Since basic concepts do not only imply cognition in themselves, but also enforce its generation and structuralization in all other areas, an alternation of the degree of cognition in the categorial area causes an alternation of cognition as a whole. A profound research of the principles of order; of the possibilities of their adaption for the mastery of the information flood; of the processes of cognition in the organ of cognition by this organ itself for a development of an understanding of cognition, which is free from alienating external relations; and on this basis, a compilation of the fundamental categories and categorial concepts should have a thoroughly fertilizing effect on all the areas of cognition. For this reason, this work should have the priority above all others.

4.5 The totality of being

Being in its wholeness which has been exposed as segmented in structural, finale, causale and material being, achieves fullness of its wholeness, that is, its totality only upon the complete, integrating interpenetration of its parts. This interpenetration which is sketched schematically in Table VII, leads to ever growing interpenetration (Table VIII).

Table VII: Interpenetration of the kinds of being I

structural	finale	causale	material	BEING
Substance	Nature	Science	phys. Sphere	material
Form	Cognition	Philosophy	vital Sphere	structural
Dimension	Man	Art	mental Sphere	finale
Function	Reality	Religion	metaphys. Sph.	causale

Table VIII: Interpenetration of the kinds of being II

structural	finale	causale	material	BEING
Principle	Law	Realisation	Number	
Stuff	Affair	Research	Matter	material
Gestalt	Purpose	Formation	Appearance	
Quantity	Essence	Explication	Adaption	
Relation	Meaning	Dialogue	Regeneration	structural
Quality	Existence	Learning	Consciousness	
Time	Freedom	Production	Exchange	
Space	Mind	Development	Method	finale
Position	Idea	Conception	Information	
Operation	World	Reception	Language	
Process	Life	Integration	Tradition	causale
State	Being	Organisation	Order	

The interaction of cognition and reality leads to the formation of ever more complex segmentations and to the actualization of their whole structural potential, in that namely, reality first lays the ground for its recognition in cognition, but then cognition in its reaction unfolds the realization of reality.

In order to make explicit this interaction in the sense of a cognition of the *reality* of the basic concepts of cognition and reality, the absolute criteria of the principles of order (mentioned above) are important:

Total unifoldness in the approach, maximum order in progressing; differentiation of the theme with growing hierarchy up to total definition of all subaspects,[31] combination of the parts in active manner to total *nettedness* and thereby actualization of all principally possible possibilities of cognition in relation to the theme, and finally unification of this activity to a totality, a product, which can be verified in its application, *e.g. in its reflection onto itself.*

I hope to have made a contribution to the clarification of this theme with my expositions on the question of order and the questions arising thereby of application of order to the achievement of conceptual clarity, the genesis of order in the process of cognition and the formation of order in the basic concepts of cognition and their contextualities.[32]

5. Epilogue

Above and beyond the contents of my paper I do hope to have given a momentum to the clarification of this theme as well with the structure of my exposition.

By uniform application of the principles of order in the main points, by hierarchical development of these in their segments, by creating relations from all parts to all other parts and by concordance of the statements with each other and in relation of the whole to the parts, my exposition appears formally as a fourfold tetravalent clarifactory pattern. This treatment of the subject and its content structure in a corresponding manner achieves a paradigmatic character by the foundation and carrying out of the subject contained within it.[33]

The structure of a fourfold tetravalent clarification spoken about in two ways is equivalent to the three-dimensional shape of Fig. 10, which becomes apparent upon turning a simple tetrahedron inside-out; an *implicit* "self-clarification" of this structure, so-to-speak. The tetravalent, tetrahedric form not only of the principles of order but also of the kinds of being, bring forth this shape in their interpenetration, which in turn corresponds to the segmentation as well as to the result of my exposition. This taken together, gives us the picture of a 3-dimensional reproduction of an explicit fourfold, tetravalent clarification structure. (Fig. 11).

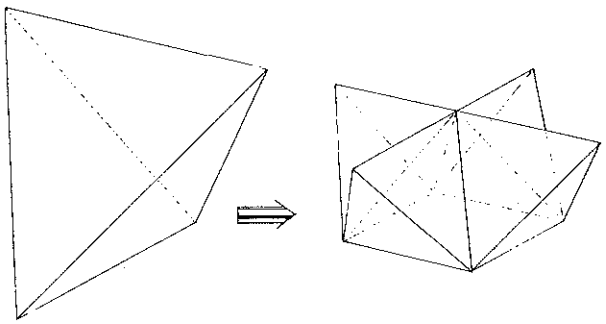

Fig. 10: Three-dimensional representation of an implicit fourfold tetravalent clarification structure

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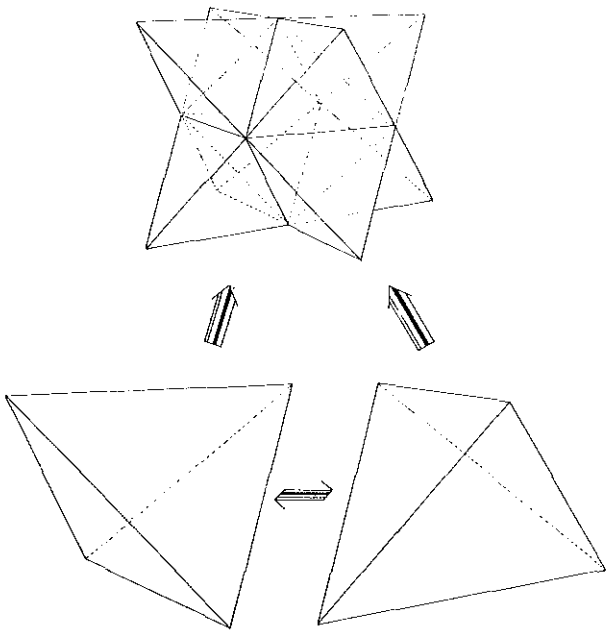

Fig. 11: Three-dimensional representation of an explicit fourfold tetravalent clarification structure

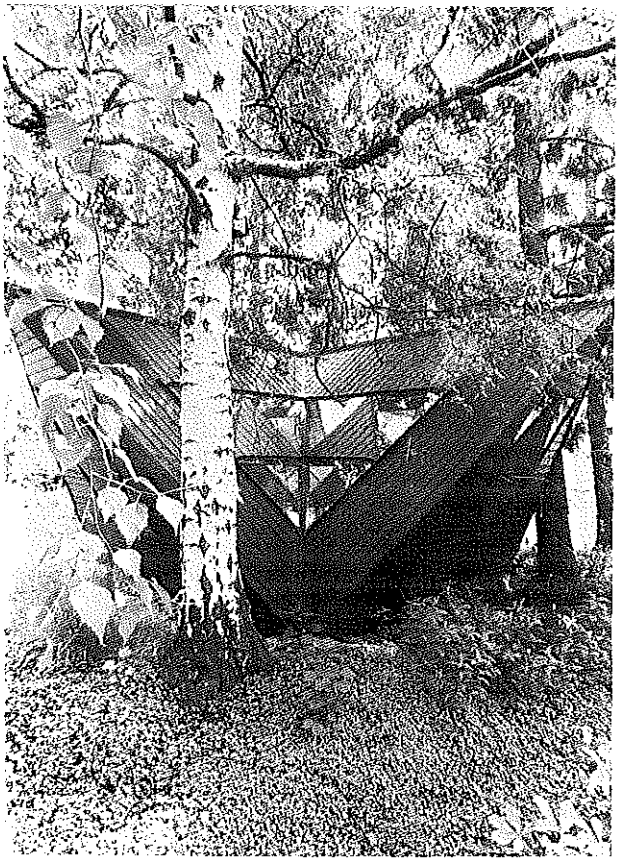

Fig. 12: The AGNIMeum – material seat of AGNIM (Association-General for Nature, Integration and Man) as an example for an implicit fourfold tetravalent clarification structure, seen from north-west.

The construction shown in Fig. 12 is an integrative pavillon which is the material seat of a society founded 1978 with the title: "Association-General for Nature, Integration and Man" (AGNIM), which took upon itself the task to further the "correspondence of Nature and Man" and to cherish the theory and practice of the formation of the diverse cognitive activities of Man in their main aspects of science, art, philosophy and religion as well as in their mutual interpenetration and integration.

Regarding the realization of scientific work on these basic concepts I should like to invite all those interested in such a clarification work to join the SIG-AG (Special Interest Group on Basic Concepts) of the Gesellschaft für Klassifikation e.V.

Notes:

1 A similar approach can be found in Papentin (1)

2 The ontological position of radical monism may be located here. The question concerning 'kinds of unifoldness' is answered by the ways in which one can move from multivalent-logical "entry-angles" into the monovalent-logical position of this monism. Seen from the dualistic position of the following principle of hierarchy, symmetry would be a kind of unifoldness.

3 Although a crystal as a structure already dimensionalized to a certain degree bears elements of hierarchy, it is capable to express the aspect of unifoldness because of its homogeneous mode of construction.

4 This is a fact of great significance; I will return to it in Sect. 3.1

5 The ontological position is here naturally the bivalent-logical dualism. Although hierarchy generally is understood as super- or subordination it is apprehended *here* more broadly as the totality of segmentational possibilities in dimensional connectiveness.
The dimensional character reveals itself in the combination of oppositions to ever increasing potentially: The kinds of hierarchy follow as arrangement and succession (An/Nachordnung), co-ordination and adjunction (Neben/Beiordnung), super- and subordination (Über/Unterordnung), intra- and extraordination (In/Auseinanderordnung), sym- and contrapositioning (Mit/Gegeneianderordnung), inter- and circumpositioning (Zwischen/Umeinanderordnung) in the generative laws of dimensional reality. Therefore, hierarchy is not limited to two-dimensional forms like monohierarchy (branch form) or polyhierarchy (umbel form).

6 A simple flower demonstrates clearly the essence of hierarchy which may be recognized in the differentiation of pattles, leaves, roots, stem, etc. The element of unifoldness can be seen in the liquid system of a plant to be found in all parts of it in the same way and which is able to bring about all the diverse outer momenta though remaining unifold in itself.

7 Here the ontological position is the trivalent-logical trialism which changes the static character of the pure dual oppositions into a dynamic oscillation. This is provoked by the threefold relation between the triadic components (cf. Sect. 2.3) which in turn causes a *regenerative feedback*. The kinds of synergy which are created hereby are quite manifold (cf. Sect. 3.4 and 4.3).

8 An example: An ecologial community with its complex system of functions is well suited to represent the essence of synergy.
The plurality of hierarchical opposities (to eat – to be eaten, to produce oxygen – to absorb oxygen, etc.) is balanced.
In this example unifoldness may be seen in the uniformly (periodically) occurring outer marginal conditions (such as air pressure, humidity, temperature, etc.)

9 In this sense its ontological position is the tetravalent-logical tetralism which encompasses a tetrality of logical triads and a hexality of logical dualities. The resulting immanent structure is not only self-regenerative but also self-evolving, that is, it is a pattern of order which creates further patterns in itself.

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10 An example: Man as an individual, as a being not only capable of self-control but also of modifying the mode of this control (inner freedom) pictures – in his holistic nature as a psycho-physiological being – this concordance by himself.
Synergy may be seen in the self-regulating organ systems (hormone-, glandular, digestion system etc.), hierarchy in the physiologic as well as neurologic segmentation (as vegetative, motoric, sensitive, imaginative, etc.), unifoldness in the self-perception as unity (ego) with the bodily expression in blood circulation which may be perceived as enlivening the whole body and converging in the heart.

11 The eldest traditions of mankind correspond with this to a high degree: "Fourfold is the order of all things. . . of plants, animals and men, of divine and worldly matters"; this can be recognized especially well in the Indogerman Tradition, e.g. the fourfold structure of Veda.

12 I am consciously using the desigination 'geometrical' and not 'topological', since the former is more commonly used with art and esthetics which play a certain role in this context and since the latter would – in a much too one-sided manner – appeal to the dimensional and therefore hierarchical character of order.

13 For further clarification purposes a table (Table I) (see Sect. 1) and an additional example are given:
In creating his music a composer has to combine different components: level of tone and tonality, melody (and contrapoint), rhythm and arrangement as well as sequence and last not least the compositional idea. Just as the single note, the single tone represent unifoldness as the basic element in this example, in just the same way corresponds totality to concordance, the melodious contrast to hierarchy and the sequentation and realization of the latter to synergy.

14 I would like to presuppose the basic works of I. Dahlberg (2–5) regarding this topic since I follow her intentions and conclusions to a large extent.

15 It may be remarked that the 'scientific concept' intended by I. Dahlberg encompasses the totality of specifications of the element of a general subject: this implies that the definitional triangle, as shown here, contains two further triangles of its kind which define definiens, resp. diff. spec. essent. etc. This problem refers us already to the concept clarification to be discussed in the following.

16 It is remarkable that already Immanuel Kant (among others) uses this procedure in his "Kritik der Reinen Vernunft" in order to reach a clarification of the 'pure concepts of reason' (6).

17 Here some considerations are of importance concerning the standpoint from which a segmentation is undertaken. (Cf. Section 4.1 where there are further examples.).

18 Which theme A. J. N. Judge has encompassed in his contribution (7) in a manner very much in accordance with the general idea of this exposition.

19 Cf. note 9.

20 This may be a bit unclear at this point but we will come back to it in Sect. 4.1.

21 Cf. Burkhard Heim in (8).

22 See e.g. (9–11).

23 This state has become known as the *transcendental state of consciousness* or *pure consciousness*. Its existence can be taken as sufficiently verified, the author himself has experienced it. I must refrain from saying much more about this state of consciousness here but the reality of it can be proven in everyones organ of cognition by the use of adequate methods.

24 A similar constellation may be found in (4,5) based on Aristotle; the segmentation of the metacategory of substance, the determination of inter- and intracategorial connectives are the results of the author's geometrical approach developed already in 1977.

25 This is shown in the arrangement of table IX in sect. 4.5.

26 This has been treated in detail by A. Diemer in (12).

27 The partitioning into structural, finale, causale and material being follows Aristotle's segmentation of *ousia*.

28 For this reason those concepts, with which the humanities operate appear here preferably, since – as mentioned already – these are more explicitly directed towards the subject resp. the product resp. the goal of cognition.

29 A broad consideration of these categories of finale being cannot be given here for reasons of time and space; in brief therefore simply the scheme of the clarificatory pattern:

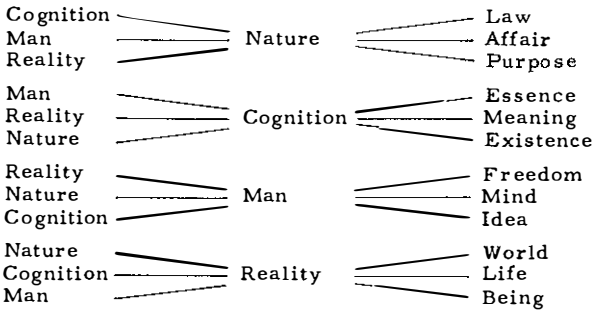

Fig. 7: Schematic clarification of the basic concepts of finale being.

30 Cf. I. Dahlberg's partitioning of the areas of knowledge into 'object areas' and 'aspect areas' (2,4).

31 This does not mean that a differentiation would have to create an ever increasing number of details but rather that the given subject is understood in an ever increasingly subtle and encompassive mode of comprehension.

32 Cf. I. Dahlberg's differentiation of the concept 'Ordnung' into a technical-practical, scientific and metaphysical dimension (2), p. 15.

33 Therefore, the criteria for verification are explicit here. The falsification criterion of Popper is already limited by the theme of my exposition, but on top of that, since the structure of this exposition contains an immanent clarificatory pattern, validity is claimed, independent of external reference.

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