10.2. *Elements of methodology, 1 st year, 1996/1997*

Contents: see p. 81

Methodology (applied logic).
I.M. Bochenski, Philosophical Methods in Modern Science, Utr./Antwerp, 1961, 18/26 (*Logic, Methodology and Science*), says that:

1.-- *"Logic," in the strict sense,*
is the "science pertaining to deciding," -- where "deciding" stands for "inferring.

2.-- *'Methodology'*
is "the theory concerning the application of the logical laws to the distinct domains".

Note.-- The author distinguishes a third aspect, namely "philosophical view of logic". By defining logic as "ontology insofar as expressed in "if, then" sentences," we have already completed a "philosophical view" of logic.

Method doctrine. 'Meta', along, and 'hodos', way, approach. Together: 'methodos'. 'Methodos' meant, in Ancient Greek, "detection, search -- preferably with order".

Objective. Bochenski.-- "Method is the way in which one advances in a particular area (domain). Also the way in which that progression takes place, namely, by ordering (*E.L. 29*: Order) our workfulness. And this directed to a well-defined goal". -- The methodology is the doctrine concerning that orderly working.

Science.
Subjectively understood, 'science' is "systematic knowing." -- 'Systematic', i.e. such that the parts are coherent and thus constitute a collective understanding (*E.L. 36*),-- in scholastic terms "a totum physicum".
Objectively interpreted, i.e. looking at the wording, the conversion into terms, science is "a coherence of objective sentences." -- Thus always Bochenski.

Note.-- "*Logic*". -- More than once the term 'logic' is used in the place of "applied logic".-- Thus, e.g., in "the logic of national politics", "the logic of this institution", "the whole logic of this book" et al. -- Similarly in "the logic of the primitives as different from ours, the Western one".

The logical laws are applied as much by primitives as by us Westerners. Except for this difference that their postulates (axiomata, principles) differ partially from ours. From these they derive, of course, partially different after-thoughts. However, this does not prevent their (formal) logic from being precisely the same as ours.

Capita selecta.

Samples, capita, chosen (selecta) (haphazardly before): behold what this propaedeutic course on "logic" finishes.

Sample 1. -- mathematical thinking.

That mathematics is "applied logic" probably doesn't need much argument. Whether contemporary mathematics is "a coherence of objective sentences" is more difficult to determine. Reason: the rapid development of the various branches of contemporary mathematics makes specialists recognize that a single person is no longer capable of overseeing the whole (and therefore the cohesion)!

The quantitative aspect.

Ch. Lahr, Logique, 559/569 (*Les sciences mathématiques*), ((The mathematical sciences),), says that mathematics is "the science of quantity." Cfr *E.L. 41*: How big, one of the categories.

That there is a thoroughly quantitative aspect to mathematical thinking is evidenced by the vast number of mathematical equations of the type "is equal to" (as big as), "is bigger than", "is smaller than".

The number and space mathematical aspect.

Lahr probably takes the term 'quantity' in the broader sense in such a way that and number- and space-mathematics find in it its object.

Ph. Davis/R. Hersh, L'univers mathématique, (The mathematical universe), Paris, 1985, 6, says what follows.-- A "naive" definition -- in its place in the dictionary and suitable as a first approximation -- reads, "Mathematics is the science of quantity and of space.

1.-- The authors add, "... as well as of the system of symbols that connect quantity and space".

2.-- The authors further state that:
a. supports that definition "on a truly historical basis" and that they make it their starting point but then to
b. depict the developments of mathematics since the last centuries and the different interpretations of mathematics in the expanded definition.

Remains, therefore, that arithmetic (quantitative aspect) and geometry (spatial aspect), for Davis and Hersh, remain starting points. For historical and practical reasons.

Conclusion.-- A definition of mathematics, without a comprehensive knowledge of it (which seems impracticable given the hyper-specializations within mathematics), is not doable. Unless as a lemma (*E.L. 91*).

Sample 2.-- mathematics as a set theory.

Th. Heath, A Manual of Greek Mathematics, New York, 1963, 38, says that the first definition of "number" ("arithmos") is attributed to the first Greek thinker, Thales of Miletos (E.L. 20). It reads "Monadon sustèma", a collection, resp. system of units. *Eukleides of Alexandria* (-323/-283; *Elements of geometry*) narrowly defines differently: "Plèthos horismenon", a well-defined collection.

Mathematics as collection theory.

D. van Dalen, Philosophical Foundations of Mathematics, Assen/Amsterdam, 1978, begins with a first chapter "*Collective Theory, a Platonic Paradigm*" (o.c., 1/18). -- Listen.

1.-- *Praxis. Today.*

"Anyone who opens a mathematics textbook these days gets the impression that without sets no mathematics can be practiced." -- The author emphasizes, among other things, "a fashionable terminology" and "sets as merely handy aids." In other words: naive stage!

2.-- *Abstract mathematics. Present.*

In. the higher (abstract; *E.L. 85*) mathematics - says van Dalen - essential, i.e. essential, use is made of the concept of sets: modern abstract mathematics, after all, denotes sets as "the elementary building blocks" of its object.-- Cf. *E.L. 28*: Stoicheiosis. In other words: modern abstract mathematics is one type of stoicheiosis.

For example, a "group" is one type of set, which includes terms such as "ordered foursome" and "image. Even "old acquaintances," such as natural numbers, integers, rational numbers, real numbers "are reducible to sets with little effort."

Final sum.

Extrapolating this experience of over half a century, one arrives at the view that "everything is a set", or: "mathematics is a set theory".

In other words: there are no "primal elements", i.e. "things" ("being") that are not a collection. A separate element counts as a collection with exactly one element!

Thus abstract mathematics sees and both arithmetic and spatial sets as its own object. Its "formal object" (*E.L. 42*). Not surprisingly because "number" is a transcendental concept (E.L. *32*).

Sample 3.-- mathematical and non-mathematical differentiation.

'To differentiate' is **a.** to subject a totality (collection/system) **b.** to internal comparison (*E.L. 58*) such that (large/small) differences are exposed.-- This allows very precise definition (*E.L. 40: Species difference*) - such that difference from the rest is exposed.

1.-- *Mathematical.*

Simple example is the rule of three (*E.L. 30*). One differentiates between all and just an all intermediate values (some). Thus one can define the requested (some) by reasoning from 100% through 1% to x% (the requested). One is then accurate to 1/100.

Note.-- The 'differential' in the strict sense, i.e. a set of values that varies, according to "greater than/less than" (*E.L./C.S. 02*), such that a limit (boundary value) is approached. -- The same rule of three can thus define more and more precisely by identifying all with 1,000, 10,000, 100,000, etc., and thus be accurate to 1/1,000, 1/10. 000, 1/100. 000.-- One can speak of exact definition.

2.-- *Non-mathematical.*

Here we differentiate partially differently. - For (sometimes ultra-small) differences, according to "greater than /smaller than" qualitative jumps occur. *Cfr E.L. 41 Quantity / Quality*).

a. *Measurable jumps.*

Ice (0° C.)/ flowing water (temperature greater than 0° C.)/ water vapor (from 100° C.).-- Small amount (pocket money, a sum)/ sum (sum of money)/ large amount (large bill, capital).

b.-- *Non-measurable jumps.*

A garment can be very demure/ demure/ less demure/ leaning toward immoral/ immoral/ annoyingly immoral.

Misconceptions.

These commit a misplaced mathematical induction (*E.L. 72*). Either as humor or as a thought exercise.

1.-- *The drop of gasoline*.-- At a gas station.-- "How much does one drop of gasoline actually cost?". -- "A nothing, of course". -- "If it is, please drip my tank full".

2.-- *The grain heap*.-- One grain does not make a heap. Neither does two "three, four and so on. So neither does a hundred, a thousand, ten thousand or more.

The nub.-- What one element has as a trait, namely not to form a heap, is attributed to all elements. Thus no element defines a heap! -- The 'heap of grain' is credited to Euboulides of Miletos (-380/-320), of the School of Megara (small Socratics).

Sample 4.-- Combinatorial aspect.

Quantitative aspect.-- Number and space mathematical aspect.-- Collective doctrinal aspect.-- Differential aspect.-- And now a word about the configurational (combinatorial) aspect.-- Cfr *E.L. 29vv.* (*Harmology or order doctrine*).

Two sets typify (define) a combination: set v1 is a number of places, provided with a (given or to be searched for) common property (= structure); set v2 is a number of things to be placed (= depicted). - Think of the animal couples in Noë's (Noah's) ark or the linen in the cabinet portions of a closet.

Mathematical operations.

Bibl. sample: I.M. Bochenski, Philosophical methods in modern science, Utr./ Antw., 1961, 52/54 (*Calculus*).

1. -- *Arithmetic operation*

We write a multiplication as follows:

27	Bochenski: The 1 of 81 belongs in the place of the tens and therefore
x35	under the place of the tens of the top number. -- "When multiplying,
135	we do not think about that. We apply very simply the syntactic rule:
81	"Every multiplication (and therefore every number line) must be placed
945	one place further to the left."
DHTE	

Note.-- This is the machine aspect of any practiced arithmetic, defined in a syntactic rule.

2. -- *Stellar operation.*

Bochenski gives the following example.

Given: The mathematical equation $ax^2 + bx + c = 0$.

Asked: To "solve" this equation.

We begin with the transfer from c to right but with opposite sign : $ax^2 + bx = -c$.

Comment by Bochenski.-- "We act - edit - according to a syntactic rule which reads, 'Any member of a side of an equation may be transferred to the other side but must then be given an opposite sign.'

Note -- the proper role of syntactic rules.

For simple operations, we can do without syntactic rules.-- "When it comes to somewhat complicated calculations, we must limit ourselves to the syntactic rule."

Reason: our thinking power is inadequate such that it would not cope without syntactic rules.

The paleopythagoreans to the point.
Bibl. sample: --- D. Nauta, Logic and model, Bussum, 1970, 26v.;
--- Th. Heath, A Manual of Greek Mathematics, New York, 1963-2, 43f. (*Triangular Numbers*).

The paleopythagoreans (-550/-300), as Nauta notes, applied model theory in their own way. The paleopythagoreans saw an intrinsic
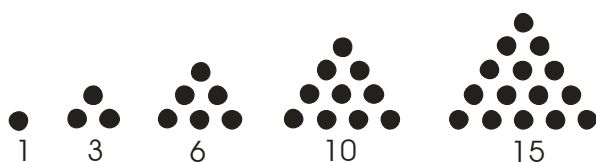

Kinship between arithmetic and geometry. Such that one could serve as a model for the other as an original. Thus the triangular numbers

Heath, o.c., 44, gives the arithmetic formula (= general model): 1/2 n (n+1), where n, defines the base of the triangle.

For example: 4 x 5 = 20, divided by 2 = 10 (note that n is a number and n+1 is the successor to that number. The 4 units in the base, when multiplied by the successor of 4 (= 5), give 20,-- dividing by 2.

Because in the primitive counting system children and adults, with the ancient Greeks, learned to count with e.g. pebbles, so 5 x 6 = 30, dividing by 2 (= 15). a model was obvious.

The triangular number 15 is derivable from: 5 x 6 = 30, dividing by 2 (= 15).
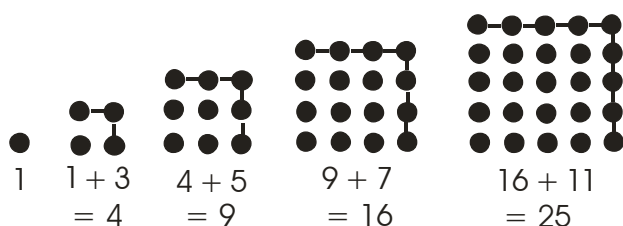
The square numbers ('squares') were another application of model theory. Note how points (units) with an angular shape (placement) served as space mathematical models of number mathematical quantities ('quantities'). Nauta.

"Although they often misinterpreted and elaborated this, the paleopythagoreans can be considered the precursors of analytic geometry.

Note.-- One sees it: places, to place. 'things' (e.g., units of number mathematics) or 'being', Behold a paleopythagorean model of combinatorics, i.e., operations situated in configurations.

Our fractional numbers, for example, do not deviate from this ancient tradition: a fraction is a collection of (two integers) to be placed in a well-defined configuration, i.e. A/B.

Sample 5.-- Formalism.
Bibl. sample: I.M. Bochenski, Philosophical methods in modern science, Utr./ Antw., 1961, 51/62 (*Formalism*).

Formalized language is a logical extension of arithmetic, as we saw *CS 05* (*Numerical and letter-using*), i.e., a combining in which syntactic rules are decisive.

Semiotics.
Cfr. *E.L. 63* (*Semiotics*).--Remember for a moment.

1.-- *Syntax.*
"Faict ficta facit". -- The West Flanders priest Van Haecke once formulated a Latin phrase to ironize his superior, Faict. Although playing with letters, as parts of the family name, 'Faict', Van Haecke nevertheless forms a syntactically well-formed sentence, which, translated, means, "Faict commits imaginary things". I.e.: he runs after utopias.

2.-- *Semantics.*
The well-formed sense signifies something in reality: namely, the person and method of the superior.

3. -- *Pragmatics.*
The well-formed and reality-reflecting sentence is purposeful: it aims to ridicule the superior as a result.

Formalism.
Instead of working with concepts, translated into terms, like traditional-classical logic (which is ontology in conditional sentences (*E.L. 11*)), formalized language works with mere terms obeying syntactic rules. Of this we saw *CS 05* examples.-- When I put "27 x 35 = ..." or "$ax^2 + bx + c = 0$" on paper, i.e. blacken paper in this way, then:
a. syntactically I form logically well-formed terms,
b. I mean semantically all that those characters, digits, letters, edit marks and so on, could denote (to begin with only itself as a character subjected to edits),
c. I mean pragmatically all that such a formalized language may want to achieve as a result.

Summary.
I calculate with characters! This is: blackened paper that I use as a language to perform logical operations.-- Something formalists call "logical syntax". Formalized language.-- The concepts are still there: a '27' or a 'bx' are ones! But seen, edited through the empty shells (lemmata) of characters.

Sample 6.-- Analysis (Fr. Viete).

Bibl. sample: O. Willmann, Geschichte des Ideialismus, III (*Der Idealismus der Neuzeit*), (Geschichte des Ideialismus, III (The Idealism of the Modern Era), Braunschweig, 1907-2, 48ff.

Cfr *E.L. 91* (*Lemmatic-analytical reasoning*).-- François Viète (lat.:Vieta) (1540/1603) was a Platonist.

1.-- *Numeracy*

"Logistica numerosa". -- Before Vieta, Western mathematics knew practically only numerical arithmetic. For example, "3+4=7".

2.-- *Letter math*

"Logistica speciosa". -- In his "In artem analyticam isagoge", Introduction to (mathematical) analysis, Viète wanted to work with Platonic ideas (*E.L. 85* (*Ideation*)), in Latin 'species! From there "logistica speciosa", Ideative arithmetic. Because instead of working with singular or private numbers (numerical arithmetic) one works with universal numbers.

To demonstrate progress on reasoning schematically:

Plain language:	Numerical language:	Literary language:
The sum of two (or	$3 + 4 = 7$	$a + b = c$
more) numbers(ideas)	figures as models	letters as models
non-operative	operative	Operative
Universal	non-universal	Universal

Explanation.

I.M. Bochenski, philosophical methods, 55v. (*Eidetic and operative sense*), says what follows.

1.-- A sign has an "eidetic" meaning if one knows the reality of it to which it refers (semantic sense).

2. -- A sign has an operative sense only when it is known how to deal with it (without thinking of the semantic sense).

Practical: when we apply only the syntactic rules (*E.L./C.S 05*) that apply to it.-- "We do not know what (*note:* in the reality to be situated outside it, -- semantically) the sign means, but we do know how to operate with it." (O.c., 55)

The ratio.

If the eidetic (semantic) meaning is known, then the operative sense is immediately available (which is what traditional logic does). Not the other way around: one can assign an operative meaning to a sign without any further semantic ('eidetic') meaning. This is - as stated above - logical syntax (*C.S. 07*).

Viète's Revolution.

It is clear that Viète's analysis extends logical syntax tremendously. She works with lemmas in the form of letters.

Lemmatic-analytical.

Those who work purely operatively work with lemmata, i.e. 'x's, unknowns (semantically speaking). So that operative work is actually one application of the platonic lemmatic analysis.-

Twice Viète's process is platonic:
a. lemmatic (operative) and
b. ideative, because he means ideas (numbers).

He himself says: "Analysis is working with the requested ('quaesitum') as if it were given ('concessum'), on the basis of inferences, from it in such a way that the requested itself is exposed."

Resume *C.S. 06*. -- Compare the paleopythagorean triangular numbers (space mathematical; 'eidetic' or semantic) with Heath's formula "1/2 n.(n + 1)" (letter arithmetic; operative or syntactic). Clearly, the computational power is much greater in the operative or syntactic case, because it is infinitely extendable to all possible numbers (cf. *CS 04*: *Limit value*).

Compare the method of paleopythagorean square numbers (space mathematical; semantic; but limited to what is intuitively insightful) and "a to m-th power times a to the n-th power" or shorter still "a to (m+n)". Which for the square numbers gives "a to (n+n)" (letter math; operative (syntactic); but infinitely applicable).

The extensions.
Willmann, o.c., 48f.. -- Next samples...
1. -- *Functional theory.*
The unknown a, e.g., can be replaced by x, i.e., a variable unknown. Which we just suggested by establishing "infinite extensibility".

Note -- "Function of" means "dependent on". Thus: x = y + z (x = dependent variable; y, z = independent variable), where x is "function of y + z".

2.-- *Analytic geometry.*
The name "analytic" still recalls Viète. *R. Descartes* (*Géométrie* (1637)) and P. Fermat (1601/1665) founded analytic geometry at about the same time, following in Viète's footsteps.-- Thus, for example, the formula "$r^2 = x^2 + y^2$" Where r is the radius or radius of a circle, drawn on the background of Cartesian coordinates (two crossed lines in rectangular fashion (x-axis and y-axis)). The drawn circles are space-mathematical models of the syntactically general formula

3. -- *Infinitesimal calculus.*
G.W. Leibniz (1682) continues as the founder. Differentials (*CS 04*) and integrals (about limits of sums) are treated syntactically (lemmatically-analytically) in it.

Sample 7.-- Genetic definition.
Bibl. sample:
-- *O. Willmann, Abriss der Philosophie*, (Outline of philosophy), Wien, 1959-5, 51; 138;
-- *Ch. Lahr, Logique*, 561s. (*La définition mathématique*).

To define is to delineate something in such a way that it is distinguishable from the rest of reality.-- Lahr.-- "The perfect mathematical definition will be one that is constructive (Delboeuf (1831/1896; Belgian mathematician) says 'genetic'), i.e., one that indicates how a mathematical entity is conceived (generated)."

Willmann.-- *Aristotle, Politika 1:2*, says that "the best mode of operation" is the one that represents the genetic process. Thus: the genesis of a city; the closed rotation of a line around one of its endpoints as a definition of the circle. - Cfr. *E.L. 48* (*Operative definition*).

Appl. model. A question.
Given.: -- Jan gave away the fifth of his marbles and kept: himself 20.
Asked : -- how many did he have at first?
Solution.: -- *A.N. Whitehead, Mathematics* (*Basis of exact thought*), Utr./ Antw., 1965, 11v..

Mathematics began as a science when someone, - probably a Greek, tried to prove theorems about all things and about some things without specification of certain individual things.
Whitehead sticks to three basic concepts: all / some / just one (cfr. *E.L. 31: Logical v.*). Of which the rule of three (*E.L. 30*) is a practical application.

1.-- The child who has to solve such a problem ('analusis', reductive reasoning), starts with a dichotomy, namely, a fifth, on the one hand, and, on the other, the rest (here: 20).
2.-- Thereupon it realizes that four-fifths "is equal to" (mathematical equation) 20 copies.--
3.-- Next comes the division of 20 by 4.

Finally, the totality (all), here: 5 x 5, must be looked up.

According to *Fr. S. Rombouts, Psychology of School Subjects*, Tilburg, 1954, 155, that series of (an algorithm's) thinking operations is followed by the test. This is a complete syllogism: Maior.-- Every (all) whole is 5/5 (= 5 x 1/5).
                              Minor.-- Well, 1/5, here, is 5 marbles.
                              Conclusion. - So all (5/5) is 5 times 5 marbles.

This is how a child learns to define, i.e. to 'construct' the requested while reasoning (the genetic definition here is to apply the rule of three, as *C.S. 04* already taught).

Sample 8.-- Defining Axiomatically.

Bibl. sample: Ch. Lahr, *Logique*, 562/566 (*Les axiomes et les postulats*), (The axioms and postulates).

-- *A. Virieux-Reymond, L'épistémologie*, Paris, 1966, 48/52 (*La méthode axiomatique*);

-- *C.-I. Lewis, La logique et la méthode mathématique*, (Logic and mathematical method), in: *Revue de métaphysique et de morale* 29 (1922): 4 (déc.), 455/474;

-- *St. Barker, Philosophy of Mathematics*, Englewood Cliffs (N.J.), 1964, 15/31 (*Euclidian Geometry*).

Note.-- The older terminology.

Lahr.-- In the older language, an "axiom" (gr.: axiom) was "a judgment which is taken as a premise and is taken as unprovable but sufficiently convincing.

For example, Eukleides of Alexandria (-323/-238) says what follows.
If A and B are each equal to C, then they are equal to each other.
Or "The whole is greater than the part". "If A and B coincide, then they are mutually equal". "The sums of equal quantities are equal".
Compare with the immediate derivations (*E.L. 71/76*).

Appl. model.

The axiom in that older sense is in itself a sum of empty shells. But then an empty shell which, if filled up (interpreted), allows one to deduce, for example.

Thus: Given.-- "$x = a + b$".

Asked -- Prove that "$x>a$" or "$x>b$".

Ax: "The whole is greater than the part". Well, x is an integer (one copy), while both a and b are just parts of x. Thus, o.v. that axiom, "$x>a$" and "$x>b$". -- cf. *E.L. 15*.

As Lahr says, "The deduction or proof is not made in virtue of the axiom but by means of the axiom." Where "in virtue of" (by virtue of) is denoted as "merely the axiom in itself".

Note.-- The older terminology.

Lahr. -- A postulate is an axiom that applies to a much more limited domain.
It is a judgment that is presuppositional (in this it is 'axiomatic') and immediately conceived as unprovable but sufficiently convincing (which again is 'axiomatic') but whose subjects and sayings are not general, indeed transcendental (all-encompassing) but limited.

Thus the typical geometrical postulates of Eukleides. "A straight line can be drawn from any point to any other point". "All right angles are equal to each other".

Note.-- The content is richer; the scope (domain) is more limited. Cfr. *E.L. 34*.

Sample 9.-- Axiomatic definition of the positive integer.

St. Barker, *Philosophy of Mathematics,* Englewood Cliffs(N.J.), 23: "Eukleides' distinction between 'axiomata' and 'postulates' is not adopted by modern theorists." Which in a way is normal. G. Peano (1858/1932), one of the founders of logistics, defines the concept of a positive integer as follows.

1.-- *Given*.

The logical (logistic) terms 'class' (concept), 'member of a class'(copy) and 'implication' (if, then),-- the number mathematical terms 'number: '0' (zero), "1, 2, ..." (copies of number), "a, b, ..." (letter numbers) are assumed to be known (given).

2.-- *Asked*.

Definition that captures both content and scope.

Solution.

Following axioms define the concept.

The successor of a number.

If a is a number, then a+ (= a + 1), i.e. the successor of a, is also a number.

The successor of a number.

If a and b are numbers and a+ is the same as b+, then a is equal to b.

In other words, two distinguishable numbers also have two distinguishable successors.

Mathematical induction.

Now see first *E.L. 72; CS 04*.-- If s is a class (term) of which 0 is a member, and every member of s (copy) has a successor within the class s, then every number is a member of s.

Note -- If a property is an attribute of 0 as a member of the class s (i.e. a common property or an attribute of essence) and if that property is also an attribute of its successor, then it is an attribute of all numbers (members of s).-- In other words: one generalizes (induction) from 0 and 0+ and further to all members of the class s.

The positive integer.

If a is a number, then a+ (the successor of a) is not 0.

Note.-- For example, -1 is axiomatically non-existent.... -- 0 is an initial number.

Abbreviated.

1.0 is a number. **2**. The successor of a number is a number **3**. Different numbers have different successors.**4** . The induction -axiom. **5**. 0 is the successor of no number. This is a set of axioms that is a true definition such that whole the domain and only whole the domain of positive integers is distinguishable from the rest of being (two.division) (*E.L. 46*).

Sample 10.-- An axiomatics is a "collective concept".
Rereading *E.L. 36* (*The Collective Understanding*).-- "All men (specimens) together (collectively) make up "mankind." "All axioms (specimens; in Peano's definition of the whole positive number right before this: five in number) together (collectively) make up (the definition of) 'the positive whole number'.""

Thus, one cannot define - articulate - one axiom unless including all others.-- In other words : One cannot define one number unless including all the others.-- That dichotomy (complementation) radically governs every collective concept or "system. Or, as the mid-centuryists said, any "totum physicum" (natural whole).

Conclusion.
1. -- Every axiom must differ from all others (the rest) (otherwise there is 'redundancy', redundancy, i.e. repetition of the same thing).
2.-- Every axiom, notwithstanding, must be related to all others.-- In other words, every axiom is distinct from all others but not separate.-- Cf. *E.L. 37* (*Complete Classification*). This is how one defines a concept. Axiomatic or not.

Note.-- the content and scope (domain) of the system.-- *E.L. 33* (*Concept content* (*kentracks*)/ *concept scope* (*intended reality*)). Compare *E.L. 86* (Content *of authority/ scope of authority*).-- The 'traits' here are the individual axioms.

1.-- For the positive integer, Peano does it with five copies.

2.-- Omit one feature of that conceptual content, namely the fifth axiom (which is a typical size axiom) and suddenly the size increases because the content is reduced.

Analogue case.
R. Blanché, Axiomatique, (*Axiomatic*), Paris, 1955, 51, says that the typical Euclidian geometric axiom is: "Through a point outside a straight line goes only one parallel line."
Riemann says "Through a point outside a line no parallel goes".

Lobachevsky says, "Through a point outside a line go an infinite number of parallels."

Because of this axiomatically defined change of content, the whole riemannian and lobachevchkian system strikes at other domains.

Riemann (+1866) and Lobachevsky (+1856) relaxed the geometric axiomatic thinking deployed by the ancient Greek Eukleides. Otherwise, they axiomatized only as validly.

Sample 11.-- Structure of axiomatics.

'Structure' is one form of classification and that is a collective classification (*E.L. 37*), which indicates the articulations of a whole.

Bibl. sample:

-- *St. Barker, Philosophy of Mathematics*, Englewood Cliffs (N.J.), 1964, 23f. (*Terms. Axioms*);

-- *E.W. Beth, The Philosophy of Mathematics*, Antw./ Nijmeg., 1944, 63vv. (*The Aristotelian theory of science*).

Summarizing the works on the subject, the structure amounts to what follows.

A.-- *An axiomatics is a system of notions and judgments (propositions)*
so that:
a. all notions and judgments apply to a well-defined domain and
b. well as "truth" (i.e. revelation) regarding that area.

Note.-- This is the ontology of axiomatics. -- The riemannian and lobachevian geometry may, to merely euklidically formed people, appear 'bizarre', as long as it is non-contradictory, it represents 'being' or 'reality' (*non-nothingness*; *E.L. 12*) and so, in the antique-ontological sense of that word (*E.L. 16*: *Transcendental 'truth' or 'revelation' of whatever something is*), it is 'true'.

Note.-- *D. van Dalen, Philosophical foundations of mathematics*, Assen/ Amsterdam, 1978, 4, says concerning the concept of a collection: "Do collections exist?" (existence) and "What are collections?" (essence).

All that is non-contradictory is being, 'something', reality. Immediately it exhibits existence and essence (actual existence and beingness), as *E.L. 16* (// 50; 68) demonstrated. Immediately it is domain (extent) of a conceptual content expressed e.g. in the axiomata of a Riemann or Lobachevsky. Axiomata that make up "the truth" of it.

B.-- *An axiomatics includes:*
a. A finite number of basic concepts ("primitive terms") that are unproven presuppositions (CS 11) that make the "truth" of all other terms or concepts definable;
b. A finite number of basic theorems ("primitive theorems"), also unproven but from which all other theorems are derivable.

Note.-- For example, *Barker*, o.c., 24 (*Euclidiall Geometry*), says that D. Hilbert (1862/1943) presupposed the concepts of "point/ line/ plane/ incident/ between/ congruent" as basic concepts,-- while O. Veblen presupposed only "point/ between congruent" and E.V. Huntington only "sphere/ enclose in" as basic concepts for the whole of Euklidian geometry. All three covered the total geometry of Eukleides, -- in different ways.

Sample 12.-- *Modes of action according to J. Royce.*

J. Royce, Principles of Logic, New York, 1912-1;1961-2, 72ff.. -- Our modes of action are governed by the same "general laws" that govern concepts ("classes") and judgments ("propositions").-- We listen to Royce.

A.-- *The combinations.*

Royce takes the terms "singing" and "dancing.

1.1.-- 0 means "no action" and 1 means "an action." This binary structure corresponds in everyday experience to either not acting (counter-model) or acting (model).-- A contradictory contradiction. Cfr. *E.L. 60;--17; 21; 57 (dissimilar); 61; 69.*

1.2.-- Within "an action" (doing something) Royce situates the contradiction pair "singing/not singing". -- One example of contradiction.

2.-- *Logical product and logical sum.*

Within "an action" (doing something) Royce situates "singing-and-dancing" (logical product), image of the mathematical product 'xy', and "singing-or-dancing" (logical sum), image of the mathematical sum 'x + y'.

These combined modes of action represent "doing something" and "doing something else."

B.-- *The encompassment (implication).*

This is the derivation, (if, then) of logic.

Royce. -- The verb "include" expresses the relationship between condition and inference. Thus: "Singing-and-dancing implies singing".

Note.-- In the case of logical sum, "Singing or dancing might (possibly) imply singing".

Note.-- The relation or ordering term 'embodiment' Royce calls a dyadic (dual), transitive (transitive) and non-total symmetrical relation or ordering. Where 'symmetrical' is translatable by 'mutual'.

Logical algebra.

Modes of action - Royce says - obey the same laws that govern classes (concepts) and statements. "The so-called 'Algebra of Logic' may be applied to them". (O.c., 74). Logical order is establishable within our human, rational modes of action.

Thus, man as a rational being, possessing "reflection" (self-perception), can consciously live through that logic at work in the collection of doing nothing, doing something, doing something else, and the implications within that collection.

Sample 13.-- History of logic. Resp. Logistics.

The term "historicity" means a view of the progress of development.-- With I.M. Bochenski we distinguish "three waves".

1.-- The antique. Mainly Greek logic.

IV-th / III-th century B.C.-- Two main lines:

a. the classical-aristotelian logic (tradition in which this course is situated as 'paraphrasis', i.e. as reciting in topical terms, if necessary, what that purport represents,-- as 'actualization');

b. stoic logic (which is rather a combinatorics sui generis).

2.-- Medieval scholastic logic..

XIIth/ XlIIth centuries.-- A further elaboration of the two antique logics provided with its own nature.

3.-- The formalized logic (= logistics).

+/- 1850 a new form of logical thinking emerges. About which something more later. He is to begin with; 'formalism' (*E.L./C.S. 07*).

Aristotle's organon.

Aristotle (-384/-322), disciple of Platon, revivalist in a very personal and even very different way from Platonism, wrote a series of logical works.

1. -- Peri katègorion.

Cfr. *E.L. 41*.-- On the categories or collective fundamental concepts. In which there is a theory of concepts.

2.-- Peri hermèneias.-- On the interpretation, understand: the judgment.

3.-- Analutika protera / Analutika hustera.

The first analytics (about the reasoning). The next or second analytics (about the proof,-- the definition and classification,-- the prepositions).

Note.-- One sees it: Aristotle does 'stoicheiosis' (*E.L. 28*) - *CS 03* - , i.e. he reveals the stoicheia, elements, or 'archai', components of reasoning to be put first, viz. understanding / judgment / reasoning. Cfr. *E.L. 10* (*Structure of logic*).

Reception.-- Aristotle's threefold basic work was, especially by classical scholastics highly valued. Especially from the modern period (1450+), it was questioned and reworked, primarily under the influence of modern nominalism (*E.L. 49: J. Locke et al.*).

But: "Aristotle's logic as a systematization of types of reasoning enjoys today a renewed appreciation". (*G.-G. Granger, La théorie aristotélicienne de la science*, (The Aristotelian theory of science), Paris, 1976, 5).

Sample 14.-- Logistics.

D. Vernant, Introduction à la philosophie de la logique, (Introduction to the philosophy of logic), Bruxelles, 1986, 7, says that since +/-1850 a cloud of 'logics' of all kinds was born. Two features.

1. Starting from. propositional logic, all kinds of extensions developed (think e.g. of multivalent logics and 'intuitionimse'; predicate logics of the first order, the alethic, deontic, epistemic, relevant, paraconsistent logics).

2. Some logics work with mutually conflicting axioms.

Logistics.

'Logistikè' meant 'arithmetic'. Indeed logistics is a logic conceived according to a mathematical model.

1.-- *Symbolic logic.*

That designation is not a happy one: non-logistic logicians also use all kinds of symbols (terms).

2.-- *Mathematical (mathematical) logic.*

This name is luckier since mathematical thinking (of which we revealed a short set of features in previous samples) is the model. Cfr "logical algebra".

3.-- *Formalized logic.*

This name is the correct one, since formalism is a.k.a. the formal object (*E.L. 42*) of these logics. *Cfr. E.L./C.S. 07* (Formalism). Terms + syntactic rules!

Stages.-- A brief outline.

1.-- *Preliminary stage.--* Fr. Viète's letter math is thinking with ideas. Add to this the classical components of logic (understanding, judgment, reasoning) along with formalism, and one already has a logistic.

2.-- *Distant beginnings*.-- Klaudios Galenos (129/201), *Ramon Lull* (1233/1306; *Ars generalis*),-- especially *G. Leibniz* (1646/1715) who elaborated *Descartes' Mathesis universalis* (a kind of general "mathematics") in his *Ars combinatoria* (*E.L. 29; CS 05*).

3.-- *Initial phase.--* The logical algebra deployed in 1847 (G. Boole (1815/ 1864) and A. de Morgan (1806/1878). Also: B. Peirce (1809/1880) and E. Schroeder (1841/1902) with a class and judgment algebra.

4.-- *The actual logistics.--* *G. Frege* (1848/1925; *Begriffsschrift*) and *G. Peano* (1858/1932; *Formulario matematico*) reestablished logical algebra. D. Hilbert (1862/1943: proof theory) helps.-- Monumental work: *A. Whitehead* (1861/1947) / *B.Russell* (1872/1970), *Principia mathematica* 1910/1913. Note: intention was to reduce mathematics to (formalized 'mathematical') logic. Not the other way around!

Sample 15.-- Mathematical proofs and non-mathematical proofs.
Bibl. sample: I. Chlebny, *Les maths font leurs preuves*, (The math proves itself,), in: *Journal de Genève/ Gazette de Lausanne* 10/11.09.1994.

At the 22nd International Congress of Mathematics (Zurich), P.L. Lions (b. 1956), among others, received the Fields honorary mark for his meritorious work in the field of applied mathematics.

Distinguish evidentiary differences between mathematics and the other subject sciences.
Here is how Lions puts it.-- "If mathematicians are sometimes not very popular with some scientists, this is due to the thorough importance mathematicians attach to proof."

1.-- *The mathematical proof.*
"Mathematics is the only science that provides definitive and irrevocable proofs, supported by a kind of reasoning that arrives at an unquestionable result."

2.-- *The non-mathematical proof.*
"The other professional sciences test a theory against some experience. These inevitably involve inaccuracies.

Appl. model.
According to physics, the fall of bodies is governed by a very simple law of nature.-- Yet observation in this regard is not in itself proof. After all, one must take into account, for example, the frictions in the air,-- the time it takes for the equipment used to react. Thus the law in question, although theoretically accepted, cannot be tested exactly. In other words: this exact testability is and remains the characteristic feature of mathematical science.

B.Russell **Bibl. sample:** *Ch. Lahr, Logique*, 566/569 (*La démonstration*).-- According to Lahr, the principal reasonings in mathematics amount to what follows.

1. -- *Deductive type.*
E.L. 78.-- From given evidences one derives conclusions. Those evidences are **a.** axioms, **b.** proven propositions.
-- The axiomatic-deductive method governs, e.g., the geometry's (*C.S. 14*).
-- The proof from the incongruent (*E.L. 78; 90*) is a variant of this.

2.-- *Deductive type.*
E.L. 78. - See also*91* . - One posits, as a lemma, a theorem to be proved. Then - step by step (algorithm) one provides its proof (analysis). - Lemmatic-analytic.

Note - Lahr,-- later Bochenski, point out the role of complete induction (*E.L. 72; CS 12*), -- to that of mathematical induction.

Sample 16.-- "The empirical cycle".

The term "empirical cycle" appears in. *A.D. de Groot, Methodology* (*Foundations of Research and Thought in the Behavioral Sciences*), The Hague, 1961, 29/34 (*The cycle of empirical-scientific research*).-- Outlining the five aspects (structure).

1.-- Observation ("observation").

One collects, according to the most accurate possible observation / perception, loose materials ('data', information). -- According to de Groot this is already done in the light of some hypothesis (lemma).

Example.

a. Given.-- At a goldsmith's house, a friend goldsmith arrives with a piece of metal.

b. Asked -- Counting on the location of the find and the judgment of fellow prospectors "it should be gold" (= hypothesis).

2.-- Hypothesis formation.

De Groot calls this stage "induction" (in a the meaning of "articulation of a hypothesis").-- Given **a.** the friend's opinion, **b.** that of the fellow gold seekers, **c.** the finding: "This piece of metal is (probably) gold. -- That's the lemma.

3.-- Deduction of tests.

Along clean logical-deductive lines, "If this piece of metal is really gold - aurum (Au) - then -- given what science knows about gold, -- its melting temperature must be 1.063° C." -- This is, for a goldsmith, a testable prediction.-- That is the beginning of the "analysis" of the lemma. Cfr. *E.L. 78; 91*.

4. -- Testing (sample).

The goldsmith melts the piece. At 1.063° C. it melts.-- This is a confirmation (in K. Popper's parlance verification) of the hypothesis.-- Immediately we come to the effective induction; viz. a sample taken confirms the hypothesis.

Note.-- **a.** Empirical.-- Means "that which rests on experience (observation/sensation)". -- **b.** Experimental.-- Experimental becomes empirical (stage a) as soon as, thanks to an intervention of man in the fact to be investigated (here: the piece of metal), a phenomenon is created in an artificial, man-controlled way.-- Empiricism is passive experience. Experiment is active experience. Here: metal heating.

5.-- Value judgment ("evaluation").

E.L. 66.-- The semantic reason.-- *E.L. 63*.-- The "value" of melting is clear: the thermometer betrays ("reveal<u>s</u>": *E.L. 36*) truth in an experimental way. - Cf. *C.S. 04* (*Measurable jump*).

Sample 17.-- Amplificatory (knowledge-expanding) induction.
This one is an early Greek achievement.
Bibl. sample: D.E. Gershenson / O.A. Greenberg, Anaxagoras and the Birth of Scientific Method, New York, 1964.

Anaxagoras of Klazomenai (-499/-428) "was the first thinker of name who was a scientist in the sense we now give it." (O.c., xiii).

1.-- *The tested specimens.*
Anaxagoras believed that "air" was a material thing.
a. Anyone can experience this empirically (e.g., by going against the wind or seeing a storm surge).
b. Anaxagoras, however, did this experimentally over.

Appl. model.-- O.c., 40.-- He took a wine bag, blew it up until it was rock hard. "With thin ('empty') air!"

Note.-- Thus, he engaged in experimental science at the initial (protoscience) level.

His tests, showing the same thing repeatedly, he could summarize, for they all pointed in the same direction: "Air is tangible-material."

Note -- This is the summative or knowledge summary induction. Aristotle will later give a pithy example of "Aristotelian" or "summative" induction (*E.L. 72*). "Man, the horse and the male mule live long. Well, they are the (only) animals without bile. So all animals without bile live long". (*Analyt. 2:23*).

When one summarizes samples that all show the same trait, separately, one "summarizes" those samples. They form the tested core of induction.

2.-- *The testable specimens.*
Anaxagoras repeated the experiment again and again. With the same result over and over again. Thus he recognized that one could extend that acquired knowledge or information ('truth') from the (sum of the) tested specimens (samples) to the (totality of the) testable specimens or samples.

This is: From the sum of tested specimens or summative induction to the totality of tested and testable specimens or amplificational (sample knowledge-expanding) induction.

Behold what - according to Gershenson and Greenberg, who thoroughly went through the texts both scientifically and philologically - the achievement of this great Greek who was Anaxagoras, still teaches us today.

Sample 18.-- *Induction platonically indicated.*

'Induction' is **a.** sampling **b.** such that one gains insight into a totality (collection (generalization) or system (generalization)).

We shall have a word later on socratic induction (which refers to human and, among other things, conscience matters). Platon is Socrates' pupil and at once induction-sensitive.-- 'Totality' (all, whole) for his ideative standpoint (*E.L. 85: ideate*) is finally 'idea'.

Bibl. sample: L. Brisson, éd., *Platon, Lettres*, Paris, 1987, 194ss., provides a passus from the Seventh Letter that further explains to us Platon's interpretation of induction.

1. -- *Enumeration.*

"For 'all that is' three elements must be present for knowledge of it to be possible. The fourth is that knowledge itself. The fifth is that which is the very object of knowledge, and that which is real.

2.-- *Explanation.*

We follow Platon's text as faithfully as possible.

A.-- *The three elements.*

Name, definition ('logos') and 'image'.

A.1.-- *The name*.

'Onoma', lat.: nomen.-- So e.g. 'circle'

A.2.-- *The definition.* --This consists of nouns ("nominal component") and verbs ("verbal component").-- For the circle: "That everywhere whose edge is everywhere at the same distance from the center point.

A.3.-- *The 'image'*-- Interpret: a singular-concrete representation or 'picture'. In short: a specimen that is sensually perceptible. That is at once a sample.-- Thus in the case of the concept 'circle': the material circle which e.g. in the sunny Greek sand is and drawn and draws and can be wiped out again.-- That "applicative model" of the "regulative model" arises-and-disappears. Is "harmony of opposites", as an ancient Greek expression says.

B.-- *The knowledge itself*.-- This is the knowing act in the soul ven the knowing one.

C. -- *The idea.*-- That is the insight valid for Platonic philosophy alone. In what? In the totality which **a.** includes all possible circles (= distributive totality or collection) and b**.** includes the whole of all possible circles, (= collective totality or system).-- Cf. *E.L. 36* (*Distributive and Collective Understanding*).

Conclusion.-- **a.** A specimen (image) **b.** is given a name and **c**. is defined. **d.** This is knowledge. **e.** This gives out on the idea.

Sample 19.-- Universal and statistical induction.
Bibl. sample: *W.C. Salmon, Logic*, Englewood Cliffs (N.J.), 1963, 55f.

The syllogism. X% of the copies of a set exhibit the property E.-- Well, e is a copy of this set.-- So e exhibits X% probability of exhibiting the property e.

1.-- *Universal induction.* If X% is equal to 0 (none) or to 100 (all), then there is universal induction.-Cfr. *E.L. 30* (*Rule of three*). 31 (*Logical square*); *CS 10* (*Whitehead's basic concepts*). These three references show that the theory of order is and always will be fundamental.

2.-- *Statistical induction.* If X% differs from 0 and 100%, then there is statistical induction.

Appl. model. Cf. *E.L. 8O* (*Induction*). - These beans come from this bag (the system from which). Well, these beans are e.g. 75% white. So the rest of the beans are also 75% white.

Note.-- One sees the complement "this / the rest".

Conditions. Induction is essentially a matter of sampling (concerning specimens).-- The transition from the summative core ("these") to the amplificational induction ("the rest") is governed by two main conditions.

1.-- *Quantitative.-* The larger the number of tested samples in a 'population' (= collection) the more approximate the generalization for the rest of the whole 'population' or collection. If one has tested only two beans "from this bag" the basis of the generalization (= the sufficient reason for it) is too small! Thus e.g. in some opinion polls, in which one guesses for six million on the basis of 1000 interviewees!

2.-- *Qualitative.-- The* more haphazard ("at random"(randomization)) the samples the more "real" (objective) they are.-- So too in opinion polls. -- If a school inspector interviews three students out of thirty, chances are he will get the wrong impression.

Polls.
1. The way of asking questions can be decisive for the answer (which e.g. is imposed, suggested).
2. The way of answering can also be decisive. Inhabitants in primitive communities "talk to their mouths" (out of primitive courtesy). Ethnologists - Margaret Mead e.g. - allowed themselves to be caught this way!
3. Forecasts must reckon with the variability of an audience.

Sample 20.-- Causal (causal) induction.

Beginning with the narrative pairing "omen/sequel," we can say that a cause is that omen which brings its sequel into existence.

1.-- *Anaxagoras.*

Anaxagoras of Klazomeinai (CS 20) engaged in one type of causation and immediately in causal induction: by experimenting, he himself became the co-cause of the consequence!

2. -- *Baconian induction.*

Francis Bacon of Verulam (1561/1626) is known for his *Novum organum scientiarum* (1620). He wanted to introduce, against the scholastic-Aristotelian tradition, a new 'organon', (*thinking instrument; CS 16: Aristotle's Organon*).

Note.-- The typical modern accent.

a. Bacon is already a nominalist (*E.L. 49; CS. 16*) and so the "cause/effect" chain becomes mere "omen/sequence."

b. He rejects mere empiricism, which only accumulates facts, and mere apriorism, which only creates ideas (concepts), in favor of experimentalism. In the spirit of 'Oxford', i.e. with the emphasis on experimentation; he connects both empiricism (facts) and concepts (ideas) in such a way that they only appear acceptable after testing by means of empirical samples.

Structure. -- This can be outlined as follows.

1.-- *Induction.*

If all water boils at 100° C., then o.k. this water and that water (samples).-- Well, (experiments show that) this water and that water boils at 100° C. So (generalizing, extrapolating, 'inducing') all water boils at 100° C.

In other words: reductive reasoning relies on cause as sufficient reason (semantic reason): "If cause, then consequence. Well, consequence. So cause". -- The reasoning stands or falls with the (causal) connection, expressed in the first preposition "If cause, then (sufficient reason for) sequel".

2.-- *Dynamic system.*

The cooking process is one type of system. And that is, a causal system. When a "totum physicum"(*E.L. 36: Collective understanding*;*31*) stands or falls with an operation, a.o. causation, then it deserves the name "dynamic system"

Baconian induction has as its "formal object" (*E.L. 42*) the dynamic of such a system.

Sample 21.-- Causal induction (Bacon, Mill).
What has just been outlined too briefly, we now specify.

1. - *Applicative model.*
Louis Pasteur (1822/1895), founder of microbiology, stood for two strongly opposing views (hypotheses).

a. The traditional, rather naive one, which advocated "generatio spontanea", literally: causeless conception, of biological beings.

b. -- The modern one, that of W. Harvey (1578/1657), an English physician, who held the proposition "omne vivens ex ovo," "all that lives has a previous living being ('egg') as its cause."

Pasteur's causal induction.
The biotope (habitat of living things) he tested was a liquid that was susceptible to fermentation processes.

a. When Pasteur brought them into contact with more or less impure air (the actual air we breathe every day that is not germ-free ("impure") and on the contrary is full of germs (e.g. bacteria), life arose in it.

b. When that same liquid was either radically cut off from the actual surrounding air or brought into contact with completely germ-free air (= lifeless air), no life arose in it.

Fr. Bacon,--in his wake J. Stuart Mill (1806/1873).
In the Latin of traditional Europe in those days, it sounded like this.

1.-- *Posita causa ponitur effectus.*
If cause, then effect. -- "If bacteria-rich air, then emergence of life".

2.a. *Sublata causa tollitur effectus.*
If the cause absent, then no life arising.-- If radical sealing of the actual air or if contact with germ-free air, then no life arising.

2.b. *Variante causa variatur effectus.*
If the cause is changed (dosed differently e.g.), then the effect is also changed.-- Thus: if very low bacteria air, then delayed emergence of life.

Note.-- Behold, in greatly simplified version, the rules of experimentation, as expressed by Bacon and Mill. Open to criticism, they nevertheless remain guiding principles. They are "the Bible of the experimental method." -- They are the regulatory model that governs the applicative model of e.g. Pasteur.

Sample 22.-- Causal induction (Mill).

Bibl. sample: *Ch. Lahr, Logique, 588s*. (*Méthodes d'exclusion de Mill*)., (Mill's exclusion methods).

Together these rules make up a cumulative induction (*E.L. 53; 55*). The "true" cause, amidst ancillary all sorts of things, is revealed by an "infallible" method (if "infallible" exists here as Lions' caveat on the matter insinuates, *CS 18*).

1. -- *Equivalence method.*
Given.-- The perception of sound.

Asked.-- Definition of Cause.-- A healthy ear "hears" the various sounds of a songbird, a beautiful love song, a train approaching, etc..

In all the cases just listed, a vibratory body is at work, from where vibrations - air vibrations - emanate that propagate through air until an ear picks them up and 'hears' them.

Rule.-- If a phenomenon, in the course of its many forms, amidst all the signs, exhibits a single recurrent sign, the latter is the cause.-- In Bacon's language: variatio experimenti (the joint signs vary).

2.-- *Difference method.*
Within the medium 'air', vibration of the air propagates. In the vacuum, however, this remains absent.

Rule.-- If the same phenomenon occurs now and then does not occur (model/counter model), showing all the signs except one that occurs with the model, then this is the cause.-- In Bacon's language: "inversio experimenti" (opposite experiment).

3.-- *Intensity method.*
CS 04 (*Qualitative jumps*). -- If one varies the number and amplitude (= maximum value of an alternating quantity with respect to its base value: in the case of e.g. vibrations half of the peak-to-peak value) of the vibrations of a body, then one establishes parallel variations in the sound.

Rule. -- If a phenomenon varies such that all the signs remain the same except one (which varies), then this single sign is the cause.

In Bacon's language: "productio experimenti" (intensity modification). As you can see, through all these methods, the lemma, the true cause, "gets a face". The analysis consists in applying Mill's rules so that the most precise definition of the true cause, i.e. not just one factor or several, but all necessary and sufficient factors (reasons), is achieved.

Sample 23.-- Sequence/condition/cause.
Ch. Lahr, Logique, 587, n. 1, distinguishes three realities:
1.-- One phenomenon follows another. Sequence.
2.- One, or the condition of that sequence.
3.-- The cause of that sequence.

Applicative model. -- The "day/night" sequence.
a. -- *We all know, by prescientific experience*, the succession of day and night,--of night and day.

Bacon and Mill label this succession as the succession of two phenomena, i.e., facts that, thanks to:

    a. empiricism (establishing facts),

    b. conceptualism (producing a thought from one's own mind ("a priori"))

    c. preferably experiment (*CS 23*) literally "come to the surface" (show themselves).

Narrative language.
The decisive 'element' or 'preposition' of any storyable (narratable) event - 'kinèsis' (gr.), motus (lat.) - is the pairing "omen/ sequel." Thus, the day before the night is 'portent' and the night following that day is 'sequel'.

b.1. -- *Partial Cause 1.*
The axis rotation of the earth.-- We know this from scientific observations. That rotation of the axis is a condition. Without that condition ('reason') no succession of day and night!

Counter model.
If the earth did not rotate on its axis, then that sequence would not be there. That rotation of the axis is therefore called "necessary condition".

b.2.-- *Partial Cause 2.*
The sunlight beaming down on the earth.
According to Lahr, this is "the actual cause" of that sequence. We, however, do not think so! For the succession is more than the descending solar light. It is a succession of descending solar light and intercepted solar light.-- However, the solar light is a condition and a "necessary condition".

Conclusion. -- Only the two necessary conditions are jointly the necessary and sufficient condition. This is "the cause" consisting of two partial causes.

But - *E.L. 19* - at once we have the sufficient reason or ground: if and axis rotation and, sunlight, then the succession "day/night" understandable, -- sensible, -- explained.

Sample 24. -- Dialogic induction.
The "Socratic induction" has two aspects.

1. -- *Induction*

"Socrates addressed the ethical virtues. He was the first to attempt, for this purpose, to articulate general definitions (*E.L. 90*). (...). The valid reason for this was to arrive at derivations by reasoning. (...). Two elements are with reason Socrates' achievement inductive reasoning and general definitions". (*Aristotle Metaph.* M 4: 1078 b 17-32).

Note -- Shocked by an élite of "sophistai", experts, who mastered one or another technè, skill (specialization) - in politics, agriculture, shipbuilding, etc. - but without sufficient "righteousness" (conscience) and immediately posing a danger to the education of the youth and the leadership of the state. - Socrates responds by saying that they have mastered some technè, skill (specialization) - in politics, agriculture, shipbuilding etc. - but without sufficient "righteousness" (conscience) and immediately pose a danger to the education of the youth and the leadership of the state.

2.-- *Dialogic induction.*

In the democratic society of Athens, it was a rule - in the agora, popular assembly (direct democracy) - that anyone who was a citizen could speak. To express one's own opinion, i.e. inductively spoken sample.

2.1.-- *Herodotos of Halikarnassos* (-484/-425)

He applied this democratic method in his Historiai: others come to speak before he articulates his "perspective" (Nietzsche) or view.

2.2.-- *Socrates.*

Socrates (and in his wake Platon) discourses, i.e. dialogues. Thus, his opinion escapes one-sidedness (*cf. 44: Plural hero of a theme*).

'Whole-isation' or Globalisation.

E.L. 80 ('Whole-isation') -- Induction can generalize but it can also generalize, i.e., try to arrive at a more comprehensive view of the whole through portions (aspects) of something.

Applicable model.

Platon, in his *State*, wants to arrive at a definition of "dikaiosunè," justice (conscientiousness).-- What does he do? He first allows others -- who sometimes differ greatly from him, indeed, contradict him -- to speak. Yet Platon is convinced that each of them reveals a part (aspect, perspective) and thus says part-truth.

Thus: Kefalos (trade environment), Polemarchos (circle of friends), Trasummachos (cynicism), Glaukon (compromise mentality), Adeimantos (opportunism) define justice each from their perspective.

Sample 25.-- Biological induction.

Bibl. sample: Ch. Lahr, Logique, 604/624 (*Méthodes des sciences biologiques*), (Methods of biological sciences).

Cfr. *E.L. 34; 37; 40* (*Porfurios' tree diagram*).- - The living being or 'being' is richer in content but poorer in scope (domain). Which will make itself felt in its sciences - the biological sciences.

Lahr. -- The object is "the living substance" (plant, animal, human). This one is much more complicated. yes. over-complicated.

1. -- *As a natural science.*
Anatomy, physiology,-- ethology -- pathology (doctrine of disease) exhibit a purely physico-chemical slant.-- Observation, hypothesis, deduction of test, review, induction are also in place here.

Appl. model.
A doctor, at a sickbed, breaks through the interpersonal relationship to fathom a fellow human being as a naturalist.

a. *Diagnosis*.-- Lemma: "What exactly makes this person sick'?". Analysis: symptom investigation,-- questioning,-- anamnesis (past investigation).

b. *Therapy.--* Lemma: "What right will cure this man?". -- Analysis: the physician's medical knowledge.

2.-- *As a science of living things.*
Science studies "facts" but, in biology, one represents living beings, not dead matter.

2.1. -- *Definition.*
Take a veterinarian standing in front of a cow.-- This living creature, with its unpredictable features, belongs at least to a (biological) type or species.-- Knowing features (concept content).-- It is a ruminant.

a. This includes: cloven hooves, multiple stomach, molars with flattened crown.

b. This excludes: claws, single stomach, canines, and molars with nodules on the crown (predator definition).

Note.-- Not so much experimentation as analogical induction is appropriate here. Cf. *E.L. 74* (*Analogical induction*) -- 'analogy' is both similarity (a ruminant and a predator are both living beings) and difference (a ruminant is not a predator). Yes, there is both coherence (cows live next to predators in the same biotope) and gap (they avoid each other because of their own group life).

2.2.-- *Definition.*
Living beings are 'creatures' in the biological sense: this cow here differs from that cow there. A living being is much more individual than an inanimate 'something! It is also much more unpredictable.

Sample 26. -- Human induction.

With *Lahr, Logique*, 625/659, it is still called "moral and social sciences". -- By "ethical (moral) being" one understands a living being gifted with spirit that includes freedom and thus, to the extent that it is truly free, i.e. decides autonomously (independently), causes itself. --

This involves a richer conceptual content and a poorer scope than the concept of biological being. Cfr. *E.L. 34* (*Being gifted*). What portrays itself in the human sciences and its methods.

Note -- Instead of expounding the traditional-scholastic opinion on the matter here we refer to *W. Dilthey* (1833/1911) and his 'Geisteswissenschaft', Cfr. his *Einleitung in die Geisteswissenschaften* (Introduction to the Humanities), (1883).

1. -- *Psychology.*

The natural science psychology of his time did consider Dilthey somewhat "real" but he saw the radical difference, the radical gap between e.g. dead matter and life and between non - human life and human life.

Typology.

Reread *CS 28*: for biological life which, distinguishable in it and even separable from dead matter, already required analogical induction, Lahr arrived at a typology.-- Analogous to this Dilthy. He too arrives at a typology of cultures (= human types).

Opm.-- Dilthey extends his psychological theory to his historiography. The past gives us a range of human types, within changing cultures.

2.-- *Hermeneutics.*

'Hermèneutikè' (gr.) means 'interpretive science.' -- Dilthey's theory of types rests on the hermeneutic method.

Bibl. sample: H. Diwald, Wilhelm Dilthey (Erkenntnistheorie und Philosophie der Geschichte), (Dilthey (epistemology and philosophy of history)), Göttingen, 1963, esp. o.c., 153/170 (Der Ausdruck als Mittelglied zwischen Erlebnis und Verständnis).

1. The fellow human being is living through something. This is what Dilthey calls "Erlebnis.

2. He / she shows this (expression). This is called "Ausdruck. These expressions are signs (*E.L. 06: Signs*); *22 (Metaphor. / metonym. signs*) which make the inner life of the soul or spirit indirectly perceptible.

3. Understanding through those expressions the inner life of the neighbor is called "Verständnis.

Behold the understanding (comprhensive, 'verstehende') method. We 'understand' the neighbor and define his 'type' only by 'understanding' his soul life via his 'expressions': i.e., to interpret.

Sample 27. -- "Thesis / hypothesis".

We remain within the hermeneutic just outlined. But actualize the systechy that *John of Salisbury* (1115/1180), the well-known medieval "humanist". presupposed.

In his *Metalogicus* (*On the Value of Logic*), he rails against an all too great separation of philosophy, which was then called 'dialectics' (logic), on the one hand, and the study of literature, which was then called 'rhetoric' (literatology), on the other. Dialectics confined itself to the universal (i.e., the 'abstract'; *E.L. 85* (*Abstracts*)). Literature - take e.g. a story or a drama - limits itself to the singular (*E.L. 55*) defined by an accumulation of details (E.L. 41: side issues) such as e.g. time and place etc..

The systechy "thesis / hypothesis".

It must be understood within the language of rhetoric at the time.

1.-- *Thesis.*

Lat.: positio, propositum.-- This is the domain of dialectics. It is the generally accepted philosophical proposition. Thus e.g. "To kill a tyrant who crosses boundaries is in conscience legitimate". Or in question form, "Is for man marriage a duty?".

2.-- *Hypothesis.*

Lat.: causa, negotium.-- This is the domain of rhetoric. It is the situated, i.e. in the singular-concrete thought, 'literary' proposition. For example: "To kill Adolf Hitler, who crosses borders, is in conscience legitimate". Or in question form: "For Anneke, is marriage a duty?".

In other words: in singular-concrete situations (= circumstances; side issues), the judgment requested is a singular judgment; in theory formation (= abstract concept; main issue), the judgment requested is a general one.

Note -- Bibl. sample:

-- *R. Barthes, L'aventure sémiologique*, Paris, 1985, 115 and 143;
-- *O. Reboul; Introduction à la rhétorique* (*Théorie en pratique*), Paris, 1991, 51 and 118.

Situational Morality.

Recent situation ethics is an update of John of Salisbury's systechy.

In its extreme form, situational morality disavows all universal rules of behavior (moral law).

Remains, then, the individual human being in singular situations who designs individual rules of behavior from situation to situation.

Sample 28.-- Humanities.

"Man" is the object of "the human sciences" of course. But it is not that simple. Let us listen to *G. Legrand, Vocabulaire Bordas de la philosophie,* Paris, 1986, 306s. (*Sciences humaines*).

1. -- *Ethical-political sciences.*

For all Greek thinkers of antiquity, the preeminent stakes of thought were **a.** man and **b**. society. 'Human sciences' were thus moral and social sciences. For virtuous man in community was the proper object.

2. -- *Humanities.*

Cfr. *E.L. 49* (*Nominalism*). - *Cfr. CS 16; CS 23*.

1. ***David Hume*** (1711/1776; pinnacle of the Enlightenment) posed, within empiricist preconceptions, the problem of "man" as the object of modern empirical professional science. He can be considered the forerunner of the 'human sciences' that have emerged since +/- 1950.

2. ***D. Diderot*** (1713/1784; the encyclopedist), *Lamettrie* (1709/1751; *L'homme machine* (1747)),-- G. Buffon (1707/1788; biologist);-- *de Sade* (1740/1814; *La philosophie dans le boudoir* (1795));-- *J. J. Rousseau* (1712/1778; *Emile* (1762)) define, in Hume's wake, man in rather downbeat ("reductive") and often contradictory ways.

3. ***I. Kant*** (1724/1804; top figure of the German Aufklärung) sees in "*man*" the pedestal of all sciences. G. Hegel (1770/1831) absorbs "man" into the all-encompassing "spirit.

4. ***Positivism*** (A. Comte (1798/1857) et al.) as a purely empiricist focus does not believe in a comprehensive humanity. Reduces "man" to (social) facts.

Note.-- In 1883 *W. Dilthey* published *Einleitung in die Geisteswissenschaften*,--(Introduction to the Humanities), work reacting against empiricism and in particular positivist humanism. *Cfr CS 29.*

The opinion of G. Legrand.-- This opinion can be outlined as follows.

a. -- *The object.*

The present human sciences amount far too much to "an accumulation of undistinguished facts and statistics" to which man is reduced.-- Only the science of history and psychoanalysis have man as an object.

b.-- *The methods.*

The human sciences have no unitary method. "The ethnologist does not interrogate primitive man on a divan (*note:* like the psychoanalyst). The sociologist with exceptions neglects the historical past of the groups he studies."

Sample 29.-- From humanities back to ethical-political sciences.

Bibl. sample: W. *Lepenies, "Ist es wirklich so?"* (*Der Möglichkeitssinn in den Sozialwissenschaften*), (The sense of possibility in the social sciences), in: *Neue Zürcher Zeitung* 24.02.1996, 69/70.

1.-- *The economy as "hard science".*
In the established sense, economics is a "rock-solid science."
a. It is natural science and does not take into account humans and their cultural context.
b. The only language that fits this is the mathematical language (tables, statistics, graphs, - mathematical theorizing), accessible only to insiders.

2.-- *Since 1989 especially: crisis of professional economic science.*
The increasing unemployment (with the "excluded") in, Western economies and the transition from the command to the market economy in the former communist countries compel the mathematizing economists to "calculate" with non-economic elements. Theoretically, economics has not yet succeeded in incorporating these elements.

3.1.-- *A style shift.*
a. The opinions of "competent rebells" (Ashok Desai) who express criticism within economic science itself;
b. the needs for some economic analysis within non-economic sciences (geography,-- biology,-- psychology, sociology,-- history,-- yes, aesthetics) lead to an updating of established economic science.

3.2.-- *The economist and his "moral science".*
"We can again speak of 'human sciences' as of 'moral sciences' (*A. D. Hirschmann Morality and the Social Sciences* (*A durable Tension*))" (W.Lepenies).-- cognitively established facts ("*Ist es wirklich so*?") (Is it really so?) are situated within an ethical-political commitment ("*Es könnte wahrscheinlich auch anders sein*"), (It could probably be different).

In other words: the morally and socially committed thinker (human scientist, including the economist) takes into account that man can intervene in what - at least in established science - is only a "natural scientific" event.

A work like *Amartya Sen*'s (Harvard) *Poverty and Famines* (1981) depicts famines in more than natural science-mathematical language.

Immediately, both the author as a committed personality and his temperament emerge more clearly again in the humanities texts.

Sample 30.-- "New Philosophy".

Bibl. sample: A. *de Waelhens, Existence et signification*, (Existence and meaning,),
Louvain / Paris, 1958, 75/103 (*Signification de la phénoménologie*).

1.-- ± *1910.*

The thinking of H. Bergson (1859/1941) has been labeled a new philosophy. Instead
of "considering" the data from a distance and as a neutral observer and thus forging
them into a philosophical or scientific "system" with unchangeable ("eternal") scope,
Bergson lives through the data (perception and sensation) and brings them to (full)
consciousness. Life becoming conscious of itself: behold what "new philosophy" is.

Note.-- This corresponds sharply to what was mentioned in previous chapter.

2.-- *Similar forms of thinking.*

According to the Waelhens, subsequent styles of thinking are also "new
philosophy."

2.1.-- *G. Hegel* (1770/1831).

The great discovery of this "German idealist" was: to bring to full consciousness the
experience of the living "spirit" (the absolute) in the universe event:. Experience and
thought are one.

K. Marx (1818/1883) put "*praxis*" at the center.-- Instead of "interpreting" data
(especially economic data) from a distance and as a neutral observer, Marx wanted to
"change" those data through "praxis" (in his case mainly of a socialist nature).

2.2.-- *S. Kierkegaard* (1813/1855).

Instead of constructing a philosophical system from a distance and as a neutral (=
not concerned with himself) observer-theorist, Kierkegaard (*E.L. 50*) wanted to
philosophize 'existentially', i.e. to try to bring the data of life (which for him had a
strong biblical bias) to (full) consciousness.

Fr. Nietzsche (1844/1900) put "das Leben" at the center and very culturologically.
Thinking is always "aphoristic" (provisionally definable in brief definitions). No
system, however comprehensive, can faithfully capture total reality. For life is
movement and as survival in the midst of challenges of all kinds that our modern culture
contains.

Note.-- According to de Waelhens, phenomenology (*E.L. 07*), if existentially
understood, is also a "new philosophy." After all, we become aware of the "phenomena"
while living and evolving.

Sample 31.-- Historical Reasoning.

From what precedes, it appears that and sciences and philosophies are historically grown. And constantly evolving.

Let us, with *J. P. Vernant, Mythe et pensée chez les Grecs*, (Myth and thought among the Greeks), 11, Paris, 1971, 55, briefly consider this.

A.-- *The common sense.*

Cfr. *E.L. 03*.-- "It had to come." -- Thus, the common sense expresses the logic (connection between omen as reason or ground and sequel) in what happens.

Appl. model.-- Suddenly in a factory a strike breaks out.
1. For outsiders, it's a complete surprise.
2. For those involved, however, it is the result ("continuation") of presuppositions ("omens").

    a. The patron has been cracking down for months.
    b. The syndicates did not give an inch.

The tension rose: it was "to cut". So the insiders say, "it had to come". Nl. when one takes all the data into account and reasons, yes, deduces.

B.-- *The logically developed mind.*

Vernant, o.c., 55, talks about the ancient Greek historian *Thoukudides of Athens* (-465/ -401) in his *Peloponnesian War*.

M.I. Meyerson says, "The order of facts in Thoukudides is logical. (....). The time with him is not chronological: that time is practically a logical time". -- J. de Romilly confirms: "Thoukudides' narrative (*cf. E.L. 54: Judicial definition)* -- e.g. of a battle -- is a 'theory'".

Note -- It is clear that de Romilly means "applied logic". Thus Thoukudides depicts a victory achieved as confirmed reasoning: "If one knows the circumstances (= factors), then the victory is deducible, because a kind of historical necessity." Or: "If the omens (as reasons or grounds), then the sequel is logically deductible".

Note.-Cfr. *E.L. 50:* Culture as the systechy "task / solution". -- Hegelian "historical rationalism". -- If there is a modern thinker who conceives of all that happens as logically structured, it is *Hegel.*

In his *Grundlinien der Philosophie des Rechts* (Basic lines of the philosophy of law), he says: "Alles was wirklich ist, ist vernünftig. Und alles was vernünftig ist, ist wirklich", ("Everything that is real is reasonable. And everything that is reasonable is real") In other words: in all that exists (is given), a 'Vernunft' (reason) is at work.

Sample 32.-- Hegelian 'deduction'.
Bibl. sample: H. Ett, ed., E. van den Bergh van Eysengha, Hegel, The Hague, s.d., 87vv..

1.-- *Herr Krug accuses Hegel* (1770/1831).
Hegel would, starting from purely abstract-a-prior propositions(in the style of classical rationalism), 'deduce' all that was, is, will be. -- Krug therefore challenges Hegel to 'deduce' in that 'a-prioric' way e.g. the existence of every dog and cat or the existence of his penholder.

2.-- *How ordinary human reason conceives philosophy* (1802).
This is the title of the work in which Hegel refutes Krug.

A. -- *The proof of existence.*
Hegel: "The existence of something is not proved from abstract principles! Actual existence is always a given".

Note -- In other words, Hegel recognizes that there is direct knowledge (*E.L. 05*). This one is apparently inductive.

B.-- *The Hegelian 'deduction'.*
Hegel: "Actual existence is non-existent (*op.:* impossible, unthinkable (*E.L. 70: Modality*)), i.e. has no (sufficient) reason or ground, without the system which includes the totality of all that was, is, will be." -- Which is 'whole-ization' (E.*L. 80*).

Notes.
1. In the wake of romanticism, Hegel sees all that is, always as all that was, is, will be. In other words: as movement, change, history and thus as story.-- Which is one form of historicism.
2. Also in the wake of Romanticism, Hegel sees each individual fact as one' moment, i.e. one movable-changing element, within the whole - the totality - of all that is.

Deducing
 "To point out and understand from the understanding of the living whole the meaning and place of e.g. dogs and cats, of e.g. a pen holder" is to deduce.

Note.-- Since Hegel starts from a given and wants to understand that given, his deduction is actually a reduction (*E.L. 78*). But with one axiom, viz. that all that was, is, will be, is situable in the totality and namely the living totality. --

It is at once one form of combinatorics, i.e. the placing of data within a set of places (here: the totality of being), (cfr. *E.L. 29* (*Harmological ontology*)), typical of Romanticism.

Sample 33.-- Pierce's pragmatic maxim.

Ch. Peirce, How to Make Dur Ideas Clear, in: *Popular Science Monthly* 12 (1878): 286/392, articulates his "pragmatic maxim":

"Consider what effects that might conceivably have practical bearings, we conceive the object of our conception to have. Then our conception of these effects is the whole of our conception of the object".

Find out what effects (which may conceivably have practical scope) we think the object of our thinking (understanding) must have. Thus our thinking (understanding) of these elaborations is the whole of our thinking (understanding) of the object.

Note.-- "Conceivably/ conceive/ conception + the object" show that Peirce is "scholastic realist" (*E.L. 49*).

1.-- Peirce.

"People have called this maxim a septic and materialistic principle. -- In fact, it is only the application of the one principle of logic that Jesus recommended: "By their fruits you will know them. Which means that this maxim is closely related to the ideas of the Gospel. (...). We must not, therefore, understand the term 'practical scope' in a low and common sense".

"If - writes Peirce in 1905 - a certain prescription for an experiment has been made ready, a certain observation will follow." Cf. *CS 19* (*Deduction of Tests*).

2. -- J. Dewey

The latter will write in 1922 that the main idea of Peirce's pragmatism (which differs from ordinary pragmatism due to its conceptual realism) is "the world in the making."

a. Not to fixate on mere thought contents - contemplative-passive - but to work with thought contents is the message. Experiment with concepts, and thou shalt learn their proper cognitive value.

b. Not the endless checking of the origin of our concepts (as a Western tradition did all too much)! Rather, working with concepts and checking the results (which is 'pragmatic') that lie in the future!

Note.-- Focusing on the 'fruits' ('results') when working with concept definition implies working with a lemma. Namely. the expected, wanted, demanded but for the moment unknown result. The analysis is the experiment. In other words: working lemmatically and analytically.

Sample 34.-- Identity and the beaming subject.
The paradox of the liar.

1. With the mouth it is said, "Outside it is raining." That is language.

2. With the heart it is said, "I mean it's not raining!". This is meta-language, language over language.

1.-- *The Identity Act.*

 Cfr. *E.L. 16; 63* (*Semantic reason*).-- The lying 'sins' (in the literal sense) against the principle of identity. For, "when it rains, it rains" and "if it does not rain, it does not rain!"-- This is not a vain tautology. On the contrary, one confesses, internally and externally, that it is not raining and that that is -- for those who directly experience that fact. (*direct knowledge; e.l. 05*) - is undeniable, even if one denies it "with one's mouth."

The paradox consists in the fact that the language is contradicted by the inner meta-language (mental reservation). In other words, there is contradiction. Between object and subject that perceives the object.

Note.-- Immediately the communication and interaction on which all coexistence relies (*pragmatic reason; E.L. 63*), is disturbed.

2.-- *Foundations of ethics.*

Immediately, some basic moral concepts are addressed.

2.1. -- *Honor.*

Liars and simulants have no real logical sense of honor. They flout the law of identity that governs all direct knowledge (the given). A logical orderly puts the honor on saying that what is, is.

2.2.-- *Respect.*

The logically orderly man testifies to reverence for "all that is, as what it is!" For "all that is, as all that is! He / she allows "all that is, as all that is!" to have justice.

Note.-- Here we have the logical basis of all that is legal doctrine.

2.3.-- *Conscience.*

The logically orderly man testifies of conscience.-- Of what he knows, of this he testifies, inwardly and outwardly, by thought, word and deed, that it is conscience, i.e. is known, and therefore has cognitive, truth value. "Wanting to have conscience".

The affirming subject..

'Acknowledge' means 'to say that it is as it is'. A logic that does not address that 'subjective' aspect is missing an essential part. To affirm the conscience (directly or indirectly) and thus to live together with fellow human beings is first of all a logical matter.

Sample 35.-- Meaning : to grasp a meaning / to interpret a meaning.

We revisit for a moment' the hermeneutic (*CS 29*).

1. According to W. Dilthey, following in the footsteps of Fr. D. Schleiermacher (1768/1834; *Dialektik* (1839)) who conceived the term "hermeneutics" (which until then meant "textual interpretation") existentially (*CS. 33*), the whole of life is one great phenomenon of interpretation. To live is to interpret.

2. According to Ch. Peirce, human beings are interpreters/interpreter(s). And this essentially.

For example, *J. Kruithof, De zingever (The meaning-giver) (An introduction to the study of man as a signifying, appreciating and acting being)*, Antwerp, 1968, says that signifying encompasses the whole of life - 'signifying' (= judging), appreciating, acting. He who treats someone without saying a word, 'signifies' that fellow human being by his 'aging' (action).

1.-- *To grasp a meaning.*
A manager (company head) has been experiencing a reduction in his profit margin for some time. This is a "sign" (*E.L. 06*): in the midst of today's rapidly changing economy, "restructuring" (adaptation by means of renewal) may be necessary. The manager "grasps the meaning" of that sign when he boldly admits that his policy is at least partly failing. It takes courage to admit that one is "failing".

If this courage is there, then the manager captures the correct meaning of e.g. the fact that the company is losing ground and making less profit. The manager defines correctly. At once defines himself correctly, i.e. his policy has gaps. To define the enterprise is to define oneself - metonymically (*E.L. 22*: in virtue of coherence).

2. -- *To interpret a meaning.*
A manager has been experiencing declining sales reports for months. This is a "sign. Perhaps not only is activation of the sales force necessary, but a thorough restructuring is required.

The manager "makes sense" of that sign when he lacks the courage to "look reality in the eye". E.g. from lack of humility (the courage to confess one's failure). His subjective input in the assessment is so necessary to "correctly grasp" the object (the company which is less and less able to cope with the competition)! He suffers from 'parafrosunè' (looking beside the given). if he lacks this courage.

Sample 36.-- Intentionality.

The fundamentally very classical *Logic* of *Ch. Lahr* which we have taken as its basis, dwells o.c., 494s., on *'l' intention*.

1.-- *The scholasticism.*

The scholastics distinguished within our attention (lat.: intentio,-- literally: inner focus) three things.

a. The object, i.e. that to which our attention is directed. Thus b. v.: (I notice) a girl (on).

b.1. The first attention ("intentio prima"). Thus e.g.: (I) notice (a girl).

b.2. The second. Attention ("intentio secunda"). Thus e.g.: (I) notice that (I) notice a girl. This second form of attention is looping or reflexive: "I notice that I am paying attention to a girl."

2.-- *Update.*

Franz Brentano (1838/1917) - of the Austrian school, updated the mid-century concept of "intentio" and situated it at the center of his psychology (e.g., *Psychologie vom empirischen Standpunkt* (Psychology from the empiric point of view)), (1874). This is called "intentionality." Indeed: notice how our psychic life stands or falls with "paying attention to" (the things in and around us). - Note that intention (of our will) is only one form of "intentional" life: the mere thought of something is already attention orientation or intentionality.

The verdict.

E.L. 56 (*logic of judgment*) taught us that, according to Aristotle, to judge is "to pronounce something from something." I.e.: to say of an original a model. To say of a subject a proverb.

Intentionally, that becomes:

"A judgment is always and everywhere: A, about something B, is said by someone (the subject or person) C, something."

In logical language: "if A (subject) and B (judging person) are known, then C (the judgment, i.e. what is said) is understandable". In other words: the necessary and sufficient reasons or grounds for a judgment include the judging person or "judging subject".

We have clearly established this above. A logic of judgment, then, which pays no attention to the judging subject (his contribution depicted in the judgment), misses something essential that is said. Yes! Who says it. Also! Only then is Aristotle's term for 'judgment(, namely 'hermèneia', lat.: interpretatio, fully understood.

Sample 37.-- Neurotic' and common sense.

Bibl. sample: A. Ellis/ E. Sagarin, Nymphomania (*A study of the hypersexual woman*), Amsterdam, 1965.

The work relies on the ABC theory, which is explicitly discussed o.c., 137/ 139 (The ABC theory of personality). We give an outline of this.

1.-- *The neurotic mind.*
A.-- Someone suffers a very painful miscalculation ("frustration").
B.-- When this one speaks about it, the (very) bitter undertone, yes, the ready expressed disappointment stands out: the soft or hard 'neurosis' (soul disorder) shows itself in this way.
C.-- I just can't get it (= A) out of my memory. That's how bad it is".

2. -- *Common sense.*
Cfr. *E.L. 03.-*
A.-- Another runs into a similar disappointment.
B.-- When this one talks about it, a certain pensive, mature nature stands out.
C.-- "I can handle it, because life is just like that. But finally: it's not that bad".

Intentional view.
"That's how bad it is" and "but finally that's not how bad it is" are two judgments.-- Without taking into account the speaking subject and only thinking of the almost equal miscalculation one arrives at a paradox: "the same is not the same", because now once it is bad then again it is not bad. In other words, both judgments about virtually the same subject without the speaking subject become incomprehensible.

The neurotic or common sense ("sense" here is "interpretive sense") portrays itself in judgment. That is, the way of responding to miscalculations differs from personality to personality. The neurotic/ neurotic pays attention to what bitterly disappoints and bites into that type of attention. The healthy reasoner also pays attention to what bitterly disappoints but with an attention that pays attention to what "life" contains of non-frustrating things.

Opm.-- *Elisabeth Kübler-Ross*, *Lessons for the Living (Conversations with the Dying)*, Bilthoven, 1970, 48/140, shows intentionality under an equally fascinating point of view: when people experience that death is near, they react successively (which is the 'normal' scheme) with denial ("That's not possible"), anger ("Who/what is doing such a thing to me'?"), stuff ("Oh Lord will give me a reprieve"), dejection ("I'm a bird to the cat"),-- finally (at best) acceptance ("I'm ready to die like everyone else").

Sample 38.-- Method and ideology.

Well known is the thesis of the neo-Cantian *Fr. A. Lange* (1828/1875), in his *Geschichte des Materialismus und Kritik seiner Bedeutung in der Gegenwart* (History of materialism and criticism of its meaning in the present day), (1866-1; 1873 /1875-2):

"Lange unreservedly recognizes materialism as a method of scientific inquiry yet denies it the right to become a philosophical worldview (*note: 'ideology'; E.L. 02*). As a philosophical world view it has - according to Lange - long been refuted by physiology and especially by Kant's philosophy". (*Joh. Fischl, Materialismus und Positivismus der Gegenwart*, (Materialism and positivism of the present), Graz, 1953, 40).

1.-- *Material object + formal objects.*

Reread *E.L. 42,* where the same data (material object) has been deemed amenable to a multitude of formal objects (views, perspectives, points of view).

Thus one can look at the totality of all that is as a materialist, i.e. as one who pays attention (= pays attention) only to what is - however "(gross) substance". -- But in this Lange distinguished, not without serious reasons, two variants.

1.1. The methodical-materialist does pay attention primarily to all that is material within the totality of being, but also directs attention beyond that realm if necessary.

1.2. The ideological-materialist, however, pays attention, of course, to all that is material within total reality, but shuts off attention to all that might be found outside it.

Even if what he identifies is unmistakably outside of material reasons or grounds, he still mordantly tries to explain that nonmaterial materially. After all, there are - for the ideologue - only purely material grounds or explanations. His type of attention does not pay attention to what is non-material. Is not open to anything else.

2.-- *Object + intentionality(s).*

E.L. 33 taught us that to every conceptual content corresponds a well-defined conceptual domain or scope.--

Well, the intentionality of the methodical-materialist contains a smaller content and thus an equally larger scope. The intentionality, however, of the ideological-materialist contains a, larger content and therefore a smaller scope.

In other words: of the total reality he understands the less the greater his content of understanding is and therefore the smaller his scope of understanding Yes, his attention is too limited for that.

Sample 39.-- Axiomatic perception and judgment.

Resume the distinction between, methodical and ideological materialism, but now in terms of axiomatics (*CS 11* and especially *CS 13*).

1.-- *There are material prepositions.*

Behold what the materialist who is purely methodical materialist presupposes as an axiom.

2.-- *There are only material propositions.*

This is the added axiom of the ideological materialist.

In other words: in terms of mid-century-scholastic logic: the first axiom is inclusive (inclusively); the ideological axiom is exclusive (exclusively). The added term 'only' (= exclusively) is a greater conceptual content but a smaller scope. For beyond the material there are no sufficient reasons or grounds for the determinable phenomena. Whereas for the merely methodical-materialist there are other reasons or explanations.

Rereading *CS 12*.-- There it sounded: "If a is a number, then a+ (the successor of a) is not 0". In other words: "0 is the successor of no number".

This added axiom is exclusive: it clearly and plainly excludes negative integers.-- But precisely because of this, the conceptual content "integer" is greater but the conceptual scope is smaller (there are, axiomatically, no negative numbers). The negative number is axiomatically non-existent, "nothing", non-being.

"Axiomatically seen", intentionally hinted at.

Let us note the analogy between Peano's axiomatics concerning the whole (positive) number and the axiomatics of the (methodical / ideological) materialist.

1.-- As long as Peano stays within his first axiom, he sees nothing but integer positive numbers. The added, exclusive axiom obliges him to do so.

2.-- As long as the ideological-materialist stays within his axiomatics, he sees nothing but only material reasons or grounds of data. The added exclusive axiom obliges him to do so.

We saw (*CS 40*) that the neurotic also holds such an added axiom: "He bites into the neurotic type of attention. He pays attention to nothing else. Sees nothing but "negative" interpretations of a frustration.

In other words: perceptions, judgments, reasonings are exclusive. So too with the ideological materialist.

Sample 40.-- Axiomatic 'theory' and real understanding help.
Bibl. sample *Ingrid De Bie, Voices heard*, in: *Humo* 27.01.1996, 22/27.

The article confirms what was said above. We summarize the essentials". It is an application of the pragmatic rule (CS 36).

I.-- *Substantive data.*

Prof. Romme and his co-workers, at the Limburg University, have been studying (and helping) people, including children, who hear voices since +/- 1989.

1. *Romme.*

"My family doctor is a sailor. He told me that he heard voices when he was alone at sea for forty-eight hours: "Just as real as if you were sitting and conversing with someone " he said".

2. *Romme.*

"In 34% of cases, people have both visual and auditory hallucinations but the two do not match."

3. *De Bie.*

"Two percent of all people hear voices. Only a minority of voice hearers are actually sick or mentally disturbed.-- Studies at Limburg University have shown this."

How it began.

Romme.-- "It started with a patient who was very troubled by voices and who was not satisfied with the way "psychiatry" was responding to it.

1. At the time, those voices were seen as a disease symptom by everyone in "psychiatry" - including me.

2. My patient rightly said, "That may well be. But "that disease" doesn't bother me. But "those voices" are impossible to live with. And the medicines don't help".

Understanding.

Cfr. *CS 29* (*Hermeneutics*).-- Dilthey: the fellow man is living through something; he/she expresses this; I understand through that expression his/her living through.

Romme.-- "I said (to the patient), 'If you really do hear voices, I have to admit frankly that I don't know anything about it.-- It may well be that others who also hear voices understand you better than I do.'

Romme organizes a meeting.-- "Then my collaborator Sandra Escher thought, 'If all these people hear voices and they recognize it in each other, we can claim that it's imagination but that doesn't help those people.'

One sees it: on the one hand, "rationalistic disbelief"; on the other, "direct observation."

II.A.-- *Children /parents.*

Romme.-- "You have people who could talk about it openly as a child (...). There are not many of those". -- "In a number of patients who started hearing voices early on, we have seen that they have never been able to express themselves freely about it." -- "A lot of people are only interested in whether the straight line to adulthood is taken: they are not really interested in what their child experiences.

Note.-- A lot of parents are thus still far from the understanding method. Even the expression is already stifled!

11.b.-- *Experience.*

Humo.-- "Isn't it true that in most cases those voices are one's own thoughts?". -- Romme.-- "That is the theory. But they don't experience it that way.-- We have unlearned here to give "the theory" the priority: with your conviction you are not helping anyone. I can think that the voices are somebody's own thoughts -- and I do think that I think that -- but with that I do not help my patients. (...) "you don't help people with a theory".

Note.-- Romme apparently means a theory that does not fit the given but is "autonomously" and "a-priori" conceived outside of any direct experience.

Sandra Escher. -- "Eighty percent of the people in our survey are convinced that "the voice" is not theirs. (...).-- If you believe you hear the voice of God and I don't, we can argue about it. But that will get us nowhere.

Axiomatic intentionality.

The modern rationalism that is actively at work here in (psychiatric) theory is trapped within a very narrow axiom. The axiom reads, "All that the average rational man, preferably the rationalistically educated man, does not himself live through, does not actually exist." Do you see the added exclusive axiom?

1. All that the average rational person experiences exists.

2. Only all that the average rational person experiences exists.

The first axiom is methodical-rationalist. The second axiom, by the addition of 'only', is ideological-rationalist. One pays attention in the long run to nothing but all that the average rationalist perceives and experiences as 'being'. The content of understanding is increased but the scope of understanding - here: the people who do not hear voices - is reduced.

Paradox.

The scientifically formed adjusts the facts to his axiomatics. The patient adapts the axiomatics to the facts.

Sample 41. -- The prejudices of Galileo and Bekker.

That today's psychiatry, insofar as it is not as an alternative, still harbors an unreal "theory" is a close tradition.

1.-- *G. Galilei* (1564/1642).
Bibl. sample: *Ch. Alain, L'effet lunaire*, (The lunar effect), in: *Psychologies* (Paris) 77 (1990: juin): 50/53.-- With Copernicus, Tycho Brahe and Kepler, Galilei founded the exact (mathematics and experiment connecting) natural science. This appears to be one of his true merits.

But George Sarton, the nestor of the history of science, says: "Galileo wanted to eliminate at all costs astrology as a form of superstition. This even led him to firmly reject the possibility (*CS 32: "Es könnte wahrscheinlich auch anders sein"*) (It could probably be different), that the moon would exert influence on the tides.

He may have been one of the greatest minds of all time, but - in this case - his passionate rationalism led him astray.- While it is true that so many are misled by their irrational urges (the urge for all that is mysterious), it is also true that Galilei's rationalism led him to prejudice. "Such a thing is no better than superstition.

2.-- *B. Bekker* (1634/1698).
This cartesian is the author of *The Enchanted World*, 4 vol., Leeuwarden, 1690. Published on the occasion of the showing of the comet of 1680.

For reasons different from Galilei's, he claimed that "sorcery, magic, the summoning of spirits under all forms is a vile and ridiculous form of superstition."

His axiom was that of the occasionalist A. Geulincx (1624/1664) and the ontologist Nic. Malebranche (1638/1715) - both Cartesians - : only God, as spirit, can act on matter ! Thereby the human self is, as it were, "a nominal, unreal, imaginary subject" (*A. Weber, Histoire de la philosophie européenne*, (History of European philosophy), Paris, 1914-8, 294).

From that massive and massive activity of God, Bekker drew the conclusion that all that is "extra-natural" (all that is paranormal) is pure superstition....

The question, "Does exact science (Galilei) or ontologism (Geulincx, Malebranche) - each in its rationalism - provide the necessary and sufficient axioms to judge the existence and being of all that the average rational man does not experience himself?" Usually such forms of thought do not even address the facts, but nestle within "theory."

Sample 42.-- The true merits of Galileo.

Bibl. sample: J. Neuvecelle, Galilée réhabilité, (Galileo rehabilitated,), in: *Journal de Genève/ Gazette de Lausanne* 02.11.1992.

This Calvinist newspaper quotes a speech to the Pontifical Academy of Sciences by Pope John-Paul. In it he said, "The new science - with its presuppositions of method and free inquiry - compelled theologians (...) to ask: 'What are our own criteria (rules) for scripture?

1. But most did not get that far. (....).

2. Galileo, who was a sincere believer, appeared to have more transparency (...): 'If Holy Scripture is infallible - so he says in a letter to Benedetto Castelli - some interpreters and interpreters of it are fallible and in more ways than one'."

Note - Cfr. *E.L. 86* (*Authority Argument*).-- Authority is like a concept: it is a content (axioms) that applies to a scope (domain).

a. Which are precisely the axioms of the Bible?

b. And so to what does its authority refer? To what domain of total reality does the truth (content) of Scripture strike,

The pope said even more.--"Science and theology must act in the fullest autonomy."

Note.-- 'Autonomy' here means the fact that science and theology each have their own axioms (conceptual content) and thus their own domain (conceptual scope). Each takes care of one type of sample from the total reality.

Or put another way, the same material object is approached from more than one formal object (*E.L. 42*).

Arthur Koestler (b. 1905),

in his *Les somnabules* (The sleepwalkers), (1960), situates Galileo: "What Galileo was: he founded dynamics (part of physics). That is enough to rank him among the people who helped determine our destiny. He gave Kepler's laws an addition that Newton needed for his conception of the universe. Newton said "If I could see far, it is because giants raised me on their shoulders". Those 'giants' were Kepler, Galileo, Descartes".

A. Koestler, as a Jew unsuspicious regarding defense of the Vatican, addresses the claims that Galileo would have provided proof of N. Coppernigk's system (heliocentrism) or would have been tortured by the Inquisition (which recent textbooks still claim).

Sample 43. -- Ch. Peirce on opinions and science.

Peirce, in his *Fixation of Belief*, in: *Popular Science Monthly* XII (1878), 1/15, briefly sets out the ways in which people form opinions and contrasts them with the scientific method.

1.1. -- *Tenacity method*

As a model Peirce mentions someone who was a rabid supporter of free trade: in order to 'prove' his opinion he only read free trade magazines! The 'truth' according to this wayward person is only to be found within his own personal mind.

1.2. - *The Authority method*

Distinguish "orthodox" from "sincere"! -- According to Peirce, ecclesiastical centers (Rome, among others) and also political centers cultivate such an opinion among their followers.

2.-. A-*priori method.*

Rational' people like to use the method of free discussion. In which each individual or group asserts what is "a-priori" i.e. preferably advocated without testing against reality beyond mere opinion and its debatability.

3. -- *Scientific method.*

Peirce calls himself "a scholastic realist" (*E.L. 49; CS 47*). Hence, he bases science on "external permanence" (literally, "external permanence").

External, because based on reality outside the mind (and discussions) of men. -- enduring, because established as the same time and again, when tested against that reality outside our minds.

He adds a third feature: scientific research does not simply reveal the truth immediately. Only "in the long run" does "the truth" get exposed in science circles.

"*Every new teaching goes through three phases*.
One attacks it as absurd; then one takes it as true but considers it of no importance; finally one recognizes its true bearing and its opponents claim the honor of having discovered it." Thus William James.

Indeed a life like that of Georg Cantor e.g. proves that, even within the science midst, one often applies "the method of tenacity" (**1.1**), "the method of authority (**1.2**) or "the method of apriority (**2**),- instead of "the scientific method (**3**), or a mixture of them.

Sample 44.-- Application of an Authority method

Bibl. sample: *S.A., Meurtre* (*L'honneur n'excuse pas tout*), (Murder (Honor does not excuse everything)), in: *Journal de Genève / Gazette de Lausanne* 23.08.1996.

On 10.01.1993, an Albanian living in Switzerland murders his wife's lover without succeeding in killing his wife.-- Whereupon, three months later, the young woman's own father kills his grandson and hurts his daughter and granddaughter, when they were out walking.

The (grand)father justified himself: "He had only applied the code of honor of his community. In fact, he had not just killed. He had however - he explained in court - acted 'passionately' in view of the 'violent state of mind following the duty of revenge'.

Bibl. sample: *T. Van Dijk, Turkish mores*, in: *hp - de tijd* 020.02.1996.-- The author: "Especially when it concerns acts that, although also punishable in Turkey, are committed to restore the honor of the wife, family, sister, the perpetrator himself, and for which - in one's own circle - admiration is reaped." -- By gossiping e.g. in the coffee house, "the honor is sullied". The 'heroic' morality demands that 'vengeance' be taken. The perpetrator therefore considers himself "a hero".

***Modalities*.**-- That family member for whom imprisonment is least unfavorable is instructed to avenge, i.e., to right wrongs. E.g.: "if the father has died and the eldest son is married and has children, the youngest son avenges himself on "the madman" who attacks mother".

Axiomatic-deductive behavior.

Axiom*.**-- "A person whose honor has been violated can only regain prestige ***within the Turkic community when honor has been restored."

Deductions.
1. "That means that your sister's rapist should be killed.
2. "This means that a son will kill his mother if she engages with other men.

In other words, given the moral axiomatics within the group, a future restoration of justice ("revenge") is predictable. Cfr. *CS 34* (*Historical Reasoning*), where there is mention of an event - an act - as of "a confirmed reasoning". What appears as 'irrational' outside the milieu of Albanians and Turks is 'rational' within that milieu: Dutch or Swiss morality - understand "axiomatics concerning morals" - makes it appear as 'irrational'!

Sample 45.-- Application of an Authority method

Bibl. sample: J. Margolis, Ces savants excommuniés, (These excommunicated scholars,), in: *Courrier international* 195 (28.07.1994), 34. The text is a translation of an article published in the Sunday Times.

1.-- *Data.*
"Before their theory was accepted, L. Pasteur (1822/1895; founder of microbiology) and A. Einstein (1879/1955; theory of relativity) were dismissed as 'dangerous deviants.' Th. Edison (1847/1931; Edison effect), when he demonstrated his electric lamp, was accused of "mystification. The brothers Wilbur (1867/1912) and Orville (1871/1948) Wright, after their revolutionary flight, were not even believed for two years "for science had decided that a machine, if it weighed more than the air, could not possibly fly." When Alfred Wegener (1880/1930; geologist) recited the theory concerning the drift of the mainland, he was ridiculed. (...).

2.-- *'Heretic'*
In a TV series designed by T. Edwards, "Heretic" (BBC 2), the question was raised: "How should respected scientific institutions react when renowned scientists defend revolutionary theories?". The series shows six 'heretics' who accidentally discovered a new truth that goes against established opinions in the scientific environment, and were consequently expelled from that environment.

An example.
J. Maddox (physicist; editor-in-chief of *Nature*): "*Ruprecht Sheldrake*, who in his *A New Science of Life* recited the morphogenetic fields as a hypothesis, replaces science with magic. Such a thing may be condemned with the same terms as those of the popes who condemned Galileo (CS 45v.). And for the same reasons: it is heresy".

An example.
L. Wolpert (prof medical biology) : "It is an absurd series! The way the broadcasts were presented makes me delirious with rage. (...) I have categorically opposed this series. (...).

One sees that it is not only Albanians or Turks who think and act "straight.

Sample 46.-- Science history is destiny history.

One meaning of the Dutch word 'fate' reads "Course of events (course of events) as disposed". A second meaning reads, "Superhuman power that controls ('arranges', 'disposes') of events." Hence: 'destiny', -- which always includes an element of unpredictability, non-deductibility (by our human mind).

Well, the thesis of this little chapter is that scientific progress, no matter how 'theoretically' and 'rationally' driven by scientists, invariably includes an element of 'fate', i.e. unpredictable events. So that - what is called - destiny is one of the conditions that 'explain' science history.

How the zookeeper had scientific intuition.

Bibl. st :. *P. Bourget, Il y a cent ans on découvrait la cause du diabète d'une drôle de façon*, (One hundred years ago the cause of diabetes was discovered in a funny way), in: *Top Santé* 1993: mai, 28/31.

We are 1889. In Straszburg, now Strasbourg. In the laboratory of the Medizinische Klinik. Joseph van Mering, prof of pharmacology, and his assistant Oskar Minkovsky, Russian physician, are studying the role of the pancreas (pancreas) in the digestion of fats.

In the process, Joseph Zinck is the animal caretaker. He literally encourages them: he spends the night with the test dogs whose pancreas has been surgically removed, because the animals were constantly suffering from thirst.

The dogs urinate very often. The barn shows urine everywhere. Minkovski points this out to Zinck. Zinck replies, "I don't know what you did to those dogs, but since their operation they pee everywhere. They are always thirsty and the urine attracts flies. I think that you have given them 'zuckerkrankheit' (diabetes)".

With which Zinck pronounced the scientific explanation and not e.g. Minkovsky! The latter did respond to Zinck's 'hypothesis': indeed there is sugar in the urine of animals. In other words: dogs after pancreatectomy show the ailment called 'diabetes' in humans.

Who could have predicted

- from the data - that not the scientist but the humble zookeeper would pronounce the correct interpretation and open the way for the discovery of e.g. the insulin? This is called "destiny. It seems to be "coincidence.

Sample 47.-- Science theory (epistemology).
Bibl. sample: *A. Chalmers, What is called "science? (On the nature and status of science and its methods*), Meppel, 1981.

The work lists the "four great epistemologists" (*K. Popper* (1902/1994; *Logik der Forschung* (Research logic), (1934)); I. Lakatos (1922/1974); *Th. Kuhn* (*The Structure of Scientific Revolutions* (1962); P. Feyerabend (1924/1994)). We pause to consider the anarchist Feyerabend. Chalmers summarizes.

1.1.-- *"Anything goes".*
In his *Against Method* (*Outline of an Anarchistic Theory of Knowledge*), London, New Left Books, 1975, *Feyerabend* notes that the progress (history) of physics, among other things, is partially unpredictable.

Methodical rules of conduct are necessary but not sufficient conditions to "explain" especially the revolutions in the sciences. Cfr. *CS 32* "Es könnte wahrscheinlich auch anders sein".

1.2.-- *Untranslatability of theories among themselves.*
All observation takes place "in the "light of" some theory. In some cases, the axioms of two theories differ so much on the same data that they cannot be translated into each other's terms. A scientist who nevertheless makes a choice falls into a sometimes strongly subjective preference.

2.1.-- *Soundness of science.*
Scientific knowledge or "cognition" is not necessarily more sound than non-scientific knowledge. In other words, Feyerabend renounces the 'scientism' that claims that only scientific cognition is valid. Thus, an 'outdated' Aristotelian theory or a Marxist-colored interpretation can contain an element of scientific soundness.

2.2.-- *Validity of alternative methods.*
Magic, e.g., in the form of astrology or voodoo, may have just as much cognitive validity. Feyerabend rightly denounces the fact that scientists who swear by science reject other - alternative - lightly rejected forms of knowledge without adequately examining those other forms.

As already their prototype Galilei who refused to investigate the influence of the moon e.g. on the tides (*CS 45*).-- The most superficial investigation and the most unsound arguments are considered sufficient.-- This Sarton called "something not a hair better than superstition".

Sample 48.-- A psychologist's "blind spot".

Bibl. sample: *Torey Hayden, L'enfant qui ne parlait pas*, (The child who did not speak,), Paris, 1992 (// *Ghost Girl* (1991)).

Torey is a world-renowned psychologist specializing in problem children. In 1987, in Pecking, near Falls River (Canada), she finds herself in a class of four children. In addition to three boys, there is Jade Ekdehl.

Jade.

Writer's type.-- The first day in class the three boys kicked up a fuss. Jade, however, behaved as if the class was normal without being ordered to do so she took out her math and reading notebooks. She completed class assignments and submitted them for correction. Then she practiced spelling. Sometimes she glanced in Torey's direction but mostly Torey's presence left her completely indifferent. Cfr o.c., 15.

Still contact.

After many attempts, a period of growing mutual confidentiality began. Especially after class hours.-- Writer lists -- o. c., 73/74; 123s.; 138s.; 147 -- a number of possible explanations.

1. Split personality: 'I can't bring myself to believe such a thing'.
2. Hallucinations (delusions): "I don't like this hypothesis at all".
3. Inventions: "What would Jade invent such a thing for?".
4. Abuses at home: "Doesn't seem out of the question".
5. Sexual abuse: "Some of Jade's responses show a sexual tinge".

a. Jade stated that one could obtain milk by sucking a penis. -- "Little imagination is needed to think of sperm when thinking of 'milk.' A child of eight years cannot find such a notion on his own." (o.c., 108).

b. In an after-school conversation, Jade said, "Ellie took a knife. She plopped it down Tashee's throat. Blood splattered out. Ellie caught it in an underbag". (O. c., 124).

Satanism.

"Were we supposed to believe Jade? Had they actually killed a child and drunk his blood? How could Jade know the taste of blood?".

Others than Torey posit satanism, with pedophilia and child sacrifice. Writer herself; "I believe in "evil" but not in "an entity" (*note:* Satan by the Satanists worshiped).

Oh, finally, I know too little of that". (O. c., 149). Consequence: Torey sticks to what "the psychologists and psychiatrists" typically believe,--as we saw *CS 43v.*.

Torey is honest.

A certain openness of mind (o.c., 219) - she says - is necessary to 'believe' in Satanist practices! "If Hugh (an acquaintance who knew occultism) had not discovered that specialized bookstore, (...) I would never have thought of Satanism even when Jade spoke to me of the cat and the blood.

This was partly due to my ignorance of the subject. There was also a dose of blindness in me: I was used to interpret all behavior in terms of psychology or psychiatry, excluding every other interpretation. Furthermore, there was in me - without a doubt - a certain refusal: I did not want to see". (O.c., 219). Flying saucers, the snowman, the Loch Ness monster, occultism are ""modern folklore""!

Career concerns.

What is worse, "since I was still young and saw my career threatened, I underwent the pressure of 'professionalism.'" (O.c., 220). Indeed, she did not want to jeopardize her "status" as a specialist by believing in occultism!

Some facts.

Jade leaves the school. After all, the police took Jade's accusations very seriously, investigated thoroughly, conducted excavations in the Ekdahl's garden, turned their barn upside down in search of Tashee's corpse remains.

1.-- During all those weeks of police search work, meetings of social workers and health experts, the purely psychological explanation was generally accepted. Cfr. o.c., 216.

2.-- And yet: some minor facts remained purely psychologically inexplicable! (O.c., 217). Thus e.g. the fact that Jade did not want to be photographed, the fact that she skillfully handled magnetoscope and camescope (when such equipment was little or not known), the symbol "a cross within a circle" et al.

"Taking Jade's stories seriously inevitably led to the foregrounding of ritual abuse" (o.c., 217) with torture by a group.

All the more so: in the last ten years (1981/1991), a considerable number of children have told scenes that are astonishingly similar to each other (o.c. 218),--yes, often one discovers corpses of children (o.c., 221).

Animal mutilations and human sacrifices are apparently more than media inventions, horror literature, or fundamentalist or integrist theology!

Sample 49. -- Axiomatic induction.

1. -- *Axiomatic ideal.*

Stated: someone (with e.g. the spirit of the divinity of the Bible) has an eye for the total collection and system of all possible axioms. He/she knows them thoroughly.

This implies that for every possible fact such a mind would know the right set of prepositions that would make all possible data (expressed in post-sentences) intelligible.

2.-- *Factual axioms.*

In fact, all those who do axiomatics take only a portion from that totality.-- Those who choose a portion from a collection or system are doing induction, because they are taking a sample.

In virtue of the couple "axiomatics / domain" (= definition / extent; *E.L. 34*: content / extent) - cfr. *E.L. 43; CS 11* - as the artery of traditional logic, we conclude that whoever chooses axioms (contents) in this way at random, at once represents, defines only parts of all possible domains (extent).

In other words: the narrowness, visible in what already Aristotle called "a finite number of axioms" (CS 14), of the prepositional phrases necessarily involves the narrowness of the domain or of the scope of understanding on which those axioms issue.

Note -- Reread previous section: Torey adheres to the established "scientific" (fundamentally rationalist) psychology or psychiatry with its limitation:
a. rationally provable psychological data are acceptable;
b. Only (*CS 44:* added exclusive axiom) rationally provable psychological data are acceptable.

Doesn't she herself say, "ruling out any other interpretation"? She suffers, to quote Gaston Bachelard (1884/1962; epistemologist), from "un obstacle épistemologique" (an annoying prejudice)!

Perception partly determines axiomatics,
and conversely axiomatics determines co-perception.

That's down to intentionality! Torey has not even heard of Satanism (lack of perception, i.e. information). As a result, she suffers from lack of axioms!

A hunter sees game where the non-hunter sees none, because his mind pays attention to what game is present. But also: by paying attention to it, his visual acuity increases. Those who know nothing about occultism, for example, do not see it either: they - usually - do not perceive anything relevant.

Sample 50.-- Pretending the unproven as proven.
Bibl. sample: Ch. Lahr, Logique, 699.

1.-- *"Petitio principii".*

Preposition of what is to be proved.-- So a doctor who -- obstinate / straightforward / preferred (*CS 47*) -- claimed that cholera inevitably has a fatal outcome. He was presented with one case where this was not so ("falsification" in Popper's language). To which he replied, "This specimen is not 'real' cholera". His 'principle' (premise), namely that real cholera is always fatal, he put forward unproven (= 'petitio').

2.-- *"Circulus vitiosus".*

"Vicious circle or circular reasoning". Sextos Empeirikos (tss. 100 and 300), the great skeptic, called this "diallèlos tropos", dialleel, alternate saying, because this is a double petition pricipii. One proves two judgments by first putting forward one as proven and vice versa!

Descartes' circular reasoning.

Antoine Arnauld ("le grand Arnauld (1612/1694), who with *Pierre Nicole* (1625/ 1695) published *Logique ou Art de penser* (Logic or Art of thinking), in 1659, disputes Descartes' thesis.

"How can Descartes prove that he is not committing circulus vitiosus when he claims that 'we cannot be sure that the things which we grasp ready and clearly exist unless God is there or exists?' For we cannot be sure of God's existence unless we grasp that existence ready and clear.

Thus: before we are sure of God's existence, we must be sure that the things we grasp clearly and distinctly are all true."

Note.-- Descartes was typically modern-subjectivist which led him to believe that we only directly grasp what is within us (le sens intime) (*E.L. 03*). As a result, he needed the detour of God's existence to be sure of the external world, for example!

Logicians such as Arnauld or Nicole ("la logique de Port-Royal") say: "Most human errors are due not so much to the fact that, starting from true premises, they reason wrongly, as to the fact that, starting from false judgments or untrue premises, they reason rightly."

In other words: it is the axiomata, conscious or unconscious, that obscure contact with reality, and not distraction or applied logic. Which for the umpteenth time puts the subject who reasons at the center.

Sample 51.-- The lack of really sufficient reason.
Cfr. *E.L. 19.-- **Bibl. sample:** E. Oger, Literature review (Rationality, its foundation and its samples)*, in: *Tijdschr.v.Filos.* 54 (1992):1 (Mar), 87/106.

The author dwells, among other things, on *H. Albert*, *Traktat über kritische Vernunft* (Treatise on Critical Reason), (1969) and id., *Die Wissenschaft und die Fehlbarkeit der Vernunft* (Science and the fallibility of reason), (1982).

1.-- H. Albert (1921/...), is a "critical (understand: enlightened or rationalist) rationalist" but in such a way that he combines the neutral attitude toward reality, proper to the positivist, with the thorough commitment to values, proper to the existentialist. Combinatorics that are not so evident.

2.-- *Dogmatic thinking*
This, according to Albert, is peculiar to the established and tradition-bound forms of religion, morality, and politics, -- in other words, to our culture. 'Dogmatic' Albert defines as "refusal towards all that is 'critical' research". understand: refusal toward the Aufklärung.

The principle of sufficient reason explained psychologically.
Dogmatic is anyone who wants a strong degree of certainty of life. One is certain if he has "one last", meaning: decisive, convincing, reason or ground.

The trilemma.
Wanting to prove a "final" reason or ground can be done in three ways.

a.-- *"Regressus in infinitum"*
Endless series of proofs.-- To conceive of a sentence as an afterthought of a prepositional phrase that proves it, and thus to make it true over and over again by a new prepositional phrase.-- Which is an impracticable 'justification' ('foundation', 'justification').

b.-- *"Circulus vitiosus".*
A sentence that has itself as a preposition or also that has another sentence as a preposition.-- What Oger calls 'nulfundering'.

c.-- *Letting a pre-phrase slip.*
Which amounts to relying on experience, intuition.-- In Albert's "critical" eyes, this amounts to arbitrary proof or even dogmatism.

Conclusion.-- A "final" reason does not exist as provable. So on with "preliminary reason," i.e., a foundation that is open to 'critical examination.

Behold how enlightened rationalism arrives at only provisional certainties

Sample 52. -- Again : no really sufficient reason.

Clémence Ramnoux, Parménide et ses successeurs immédiats, (Parmenides and his immediate successors), Éd. du Rocher, 1979, summarizes the reasoning style of Zenon of ELea (-500/ ...) as follows. O.c., 158.

If an opponent of my teacher Parmenides (*E.L. 18*) recites his counter-model (counter-reasoning or 'antilogia') and if from it contradictory after-thoughts follow, then this is proof that his counter-model is impossible, absurd. Which, according to *EL 90*, is reasoning from the absurd.

The basic axiom that Zenon presupposes - consciously or unconsciously - is, "If the counter model is to be valid, then no contradiction must result from it."

Refuted the counter-argument by a counter-argument.

Theorem of Parmenides. Counter-argument from an opponent. Counter-argument by an advocate.-- Such is the rationalistic chain of assertion and counter-argument ("falsification"), -- and again counter-argument.

Cl. Ramnoux rightly underscores the shift from Parmenides, who made being, logical thinking of being, ethical entry into being central, to Zenon, who logically, preferably as mathematically as possible, "finishes off" the opponents. Cfr. o.c., 154s..

"Neither thou nor I."

E.W. Beth, *De wijsbegeerte der wiskunde* (*van Parmenides tot Bolzano*), (The philosophy of mathematics (from Parmenides to Bolzano)), Antwerp/ Nijmegen, 1944, 19, notes that according to Aristotle, Zenon's counter-reasonings, though many, are nevertheless one: they show, by strictly logical means, that neither does the opponent present a final sufficient reason as does Parmenides.

In other words: the opponents have nothing to reproach Parmenides for they too fail when the question of a final, truly sufficient reason is asked.

So that H. Albert, quoted in previous section, actually represents a very old 'rational' tradition! In particular: the tradition of eristics. i.e. contention on a logical basis. Cfr Beth, o.c., 18/92 (Eristics and scepticism).

One does not attack the axiomatics of the opponent but, on the contrary, one pretends that the opponent is right and draws implausible conclusions from it. According to the formula: "if you assert that, then what you refute ('falsifies') logically follows from it".

Result: endless logical wrangling! Which philosophers of life, among others, deliberately reject as the main purpose of logical work.

Sample 53.-- The bubble of pure reasoning.

Remain with Zenon of Elea.-- With his reasoning he reasons so that he deludes himself! *Bibl. sample: Ch. Lahr, Logique*, 701s..

1.-- *Achilleus.*

Lahr summarizes.

Thesis: "The fast-footed Achilleus never catches up with the slow turtle."

Proof. -- If the interval (between space) between them becomes zero, only then is the turtle caught up. Well, meanwhile:

a. increases the turtle's lead (because she also moves) and

b. such that it increases it endlessly so that the interval never becomes zero.

Note -- Lahr: **a.** division of a length (here: interval) into proportional parts (first dividing into two halves, then dividing each of the halves again into two halves and this endlessly) amounts to a limit (*CS 04; 09*);

b. division into equal portions, (two halves; two fours, etc.) not.

2.-- *The flying arrow.*

Thesis: "Flying is a succession of stoppages".

Proof. a**.** The arrow does not move where it is now because it "is" there (motionless);

   b. he also does not move where he is not yet, because he is not "there" yet.

'Being', parmenideanly understood, excludes movement (yes, all change). There is, fundamentally, only unchanging, motionless 'being(s)'....

Note.-- Even the modern Descartes still defined motion in a similar way. In which he was criticized by Leibniz: an arrow passes through every point of its traveled path. Otherwise a moving and a non-moving body are indistinguishable.

Lahr: actual movement is continuous; Zenon's movement, a "construction of his reason," amounts to a discontinuous succession of stoppages.

3. -- *The change.*

Thesis: "Change does not exist".

Proof. -- To change is not to 'be' what one previously 'is'. Without already 'being' what one is not yet 'being'. Both are forms of "not being."

Note.-- Lahr: Zenon 'forgets' that in between 'being' also exists. Between no longer and not yet 'being'.

Note.-- To reason without direct contact of observation is to construct concepts, judgments, reasonings in response to what is observed.- Which deserves the name 'constructivism'. 'Reason' and 'reasoning' are thus in danger of shutting themselves in. What we call 'air-bubble thinking'.

Sample 54.-- Dogmatic and skeptical reasoning.

Bibl. sample: E.W. Beth, The Philosophy of Mathematics, Antw./ Nijmeg., 1944, 86/91 (Skepticism).

Beth: "Mathematics in antiquity has often been the chief ally of dogmatic philosophy."

1. -- Dogmatic reasoning

a. The footing. -- The dogmatist(s) first secures the foundations or bases, i.e. apodictically certain precepts.-- What is now called 'fundation(al)ism'.

b. Method. - On the foundation, the dogmatist(s) builds - by a purposeful method - "something positive" (something constructive). Thus Beth.

The term "dogmatic".

Reread *CS 56*: there, 'dogmatic' was all that modern-rationalist criticism rejects or refutes.-- So do not confuse the modern-rationalist definition of 'dogmatic' with Beth's definition.

Note.-- 'Dogmatism', defined as uncritical confidence in one's own preconceptions and methods such that one harbors the delusion of having "the truth", is something else again.

2.-- Skeptical reasoning.

'Skepticism', in ancient Greek 'inquiry', was "traditionally the enemy of dogmatic reasoning" (Beth). Both the foundations (hence foundations crisis) and the methods (hence methods crisis) of the dogmatic style of thought are subjected to criticism, diminishing (refuting) scrutiny.

Note -- Deconstructionism.

Bibl. sample: Th. de Boer et al, Modern French philosophers, Kampen / Kapellen, 1993.

The work talks about interpretive ('hermeneutic' (*CS 38*)) thinkers. But then almost always committing 'deconstructive' interpretations. In French: "interprétation déconstructive", -- what do they deconstruct?

a. The foundations of either all Western thought or modern thought.

b. The methods of either all Western philosophy or modernity.

In the wake of Nietzsche and Heidegger, J.Derrida (1930/2004) is at the forefront of this.

Note.-- In Catholic circles, dogmatism is now often called "integrism" (= preserving the integrity (wholeness, flawlessness) of the foundations and methods of Catholicism).

In Protestant circles, people speak of "orthodox" or "fundamentalist" Protestantism.

In philosophical circles, the term "essentialism" as dogmatic thinking understood has been doing well for a few years now: one exempts the essence from the great tradition.

Sample 55.-- "Genetic fallacy".
Bibl. sample: *W. Salmon, Logic*, 67/70 (*Argument against the man*).

1. -- *Genetic definition.*
"We think 'genetically' (ancient Greek: gennètikos) when we express, e.g., the becoming of a plant (...) or the history of a text from its first draft in the mind to its completion." (*O.Willmann, Abriss der Philosophie*, Wien, 1959-5,51).

2.-- *Genetic fallacy.*
English: "genetic fallacy". -When someone refutes another by deconstructing his/her claim by declaring it genetic (one form of "argumentum ad hominem"), he/she is committing genetic definition.

Note.-- Fr. Nietzsche calls this "genealogy," statement starting from genesis or history.

Platon psychoanalytically 'explained'.
Salmon, o.c., 69.

1.-- *Platon is a neurotic.*
Cfr. CS 40.-- In the wake of S. Freud, some psychoanalysts claim that Platon, given his psychic structure, was neurotic. In the context of his Oedipus complex, his relationship to "the mother" had not been clarified. Thus, he acts like a deranged person.

2.-- *Platon "rationalizes".*
Platon's texts, if examined psychoanalytically, betray his neurosis. In his texts he continually settles, unaware of this, with his 'undigested' complex (= inner conflict). He philosophizes in such a way that his neurosis is reflected in his seemingly logical reasoning. His clouded psyché disguises itself in the beautiful garment of 'rational' texts.

'*Rationalization*' means, among other things, "to turn what is not in itself rational into rational terms." -- e.g., a person who performs a post-hypnotic command will give an anything but hypnotic "explanation" of their behavior, since they remember nothing of a hypnotic operation.

Note.-- **1.--** *Salmon*.-- Even if Platon was more neurotic, his reasoning (socratic induction, deduction and reduction) remains logically valid.

2.-- *K. Popper*.
In a Q&A, Popper once remarked that psychoanalysts illuminated so large a range of concepts with so little conceptual content. Popper further blames psychoanalysts for the appalling lack of testability of what they claim about the depths of the soul. Perhaps their assertions betray, more about themselves!

Sample 56.-- Undecidability.

Bibl. sample: I.Bochenski, *Philosophical methods in modern science*, Utr./ Antw., 1961, 72v. (Semantic steps).-- Reread *E.L. 63* (*Semiotic reason*).

Object / object language / meta language.
The semantic reason is threefold.

1.-- *Object.*
The semantic zero ('zero' because there is no language yet) is the given as far as there is not yet, -- for any language. Thus e.g.: (The objective, ascertainable fact of) "that girl over there".

2.1.-- *Object language.*
The first semantic or language step.-- The fact is expressed.-- For example, "that girl over there".

2.2.-- *Meta-language.*
The second semantic or language trap: **a.** The fact **b.1** is verbalized and **b.2** this verbalization is in turn verbalized,--quoted.

Direct and Lateral Reason.
The citation can take two speech forms.

a. Direct speech (where 'speech' here means 'linguistic utterance', in French 'discourse'). Thus : "He said, 'That girl over there'.

b. Lateral Reason. Thus: "He said that girl is over there". Lateral speech contains a main clause and a minor clause.

Lieges.
Reread *CS 37* (*The paradox of the liar*).-- In lying, both language and meta-language are present but within the lying subject. A lying cites (meta-language) and does cite itself (object-language). Thus: "what I say now (language), is false (meta-language)". Language over (its own) language!

Undecidability. No "nonsense.
1. If the lying person in "what I am saying now" is speaking truth, then in "is false" he/she is saying untruth.

2. If he/she is lying in "what I am saying now", then he/she is saying truth in "is false". The subject ("What I am saying now") is undefinable and therefore undecidable because it gives rise to "either true or false".

Bochenski calls the saying "semantic nonsense." Better were to speak of undecidability, because nonsense in the sense of "absurdity" is not. "semantic undecidability".

If logic has to deal with the subject, it has to deal with the lying subject. And even then with a subject who, without further testing of the 'zero stage' ("What I am saying now"), does not reveal his secret. Semantic testability would reveal that secret.

Sample 57. -- Alpha sciences and beta sciences.

Bibl. sample: *P. Cortois, Snow and the "two cultures" - discussion* (*Thirty years later*), in: *The Owl of Minerva* 11 (1994): 2 (winter), 121/132.

In 1959, *P.C. Snow*, a physicist, gave lectures in Cambridge entitled "*The Two Cultures and the Scientific Revollion.*" After a publication in *Encounter*, a revised edition followed, in 1964: *The Two Cultures and a Second Look*, Cambridge.

Thesis of Snow.-- Within the Western world, two cultures have grown apart.

1.-- *The alpha - world.*
In English "humanities". -- Of these, the man of letters is the prototype.

2.-- *The beta - world.*
In English "sciences". -- Of these, Snow sees in the physicist the prototype. Snow, as a one-sided scientifically oriented intellectual, sees traditionality in the culture of the Humanities and faith in progress in the culture of the Sciences.

The concept of culture in snow.
Cfr. *E.L. 50* (*Culture*).-- Outline.

1.-- *For Snow, for example, one speaks of "the culture"*
(by which one then means the Humanities) and "science" (as if it had no standing with culture).

Note.-- Thus, in Germany, *Joh. Adelung, Versuch einer Geschichte der Cultur des menschlichen Geschlechtes*, (An attempt at a history of the culture of the human race,), Leipzig, 1782, upholds an analogous dichotomy. For Adelung, "Cultur" is a property of privileged classes.

But *E. Kolb, Culturgeschichte der Menschheit*, (Cultural History of Mankind,), Pforzheim, 1843, and *G. Klemm, General culture science*, Leipzig, 1855-2, hold a broader view that includes e.g. material prosperity.

Before Snow, "culture" includes philology (history and language and literature) and artistry as well as a philosophy of culture.

2.-- *Snow also claims for the Sciences the property of 'culture'.*
This is despite the fact that the sciences are intertwined with engineering (technology), economics (industrial revolution e.g.), political life, national defense.

"Living together apart
Snow regrets that both branches of the one culture, e.g. in the universities, "live together separately". He even wants to see the 'irrationalism' of the Humanities and the specialism of the Sciences overcome by a kind of fusion of the two.

Sample 58.-- Alpha - sciences and gamma - sciences.
Bibl. sample: P. Cortois, Snow and the "two cultures" - discussion, in: *The Owl of Minerva* 11 (1994): 2 (winter), 121/132;

C. Maes, Chaos at the edge of the sciences, in: *Our Alma Mater* 50 (1996): 3 (Aug.), 379/408 (esp. a.c., 393/403: *Chaos: God of Confusion*).

Three cultures.
One noted, among other things, a title like *W. Lepenies, Die Drei Kulturen (Soziologie zwischen Literatur und Wissenschaft*)! (The Three Cultures (Sociology between Literature and Science). There are now Humanities, Sciences and Social Sciences. A third world: that of the behavioral and social sciences (linguistics (including structuralist),-- psychology and sociology,-- economics).

Note.-- To stay close to daily reality, watch as the sociologists of religion begin to play a leading role! "*Foi et valeurs*", ("Faith and Values"), published recently in Dimanche (the French-language parish magazine) in which, among others, the UCL sociologist *Rudolf Rezsohazy* speaks, makes even our cardinal react ("I am not alarmed. I am concerned"). For, with new methods, sometimes copied from the beta sciences, and adapted (e.g. mathematical) methods, e.g. the sociology of religion is imposing itself. Unlike the traditional alpha sciences. - The humanities - gamma sciences - which have emerged since the 1950s, have created a third world of culture.

Note.-- One reads e.g. *D. Villey/ Colette Nême, Petite histoire des grandes doctrines économiques*, (A short history of the great economic doctrines), Paris, Litec, 1992-2 (esp. o.c., 315/346 (*Le rapport des disciplines voisines: économétrie et psychologie et sociologie*), (The relationship of neighboring disciplines: econometrics and psychology and sociology).

On the one hand, economic science has attempts to arrive at an overarching theory (Keynesian, neo-Keynesian). On the other hand, the same economic science knows - apart from econometrics (matrix mathematics, the concept of linear programming, game theory, macroeconomics) - the integration of e.g. psychology and sociology.
But as social behavioral sciences. Different from the classic alpha sciences.

General Conclusion.
'Science' is now threefold. Each of the three types has its own axiomatic (which are often forgotten but very much in danger of becoming ideological) and its own methods (which are often open to debate).

Today's "separate society".
Bibl. sample: *C. Maes*, a.c., 393vv.. --

The article provides a wonderful example of how sciences "live together separately." -- Let's go into a few details.

(I).-- *Scientific chaology or chaos theory.*

1. -- *The term "chaos".*
Logic works with well-defined concepts.-- Maes notes that "chaos" -- outside the specifically physical domain -- simply means disorder, disorganization.

Even in *I. Prigogine / I.Stengers, Order out of Chaos*, London, 1984, this "ordinary" meaning works, not deterministic chaos but disorganization is at the beginning of the process of self-organization.

Applicable model.
The typical physics concept of "chaos" illustrates the author as follows.
Supposedly: there is a, imagined billiard table that:
1. shows no frictional resistance and
2. has a rounded outline without corners. Because an extremely small deviation in the angle at which one knocks the ball away elicits a set of obviously very different trajectories, the movement of the ball shows a "chaotic progression."

Chaotic systems, such as the motion of a billiard ball, are among other things very 'sensitive' to initial conditions, and in such a way that for every initial condition another can be found which is very close to it but which sends the system along a thoroughly different trajectory.-- "Even if this difference is initially very small, if we wait long enough, a noticeable deviation will occur." (A.c., 380).

Defined more generally: the movement of a physical system that consists of more than one component and is 'sensitive' to interactions and especially to initial and/or boundary conditions is called 'chaotic'.

Opm.-- *H. Poincaré, Les méthodes nouvelles de la mécanique céleste*, (The new methods of celestial mechanics), Paris, 1899, seems to be the first work on chaology. He established that the mathematical equations of mechanics which represent a process, sometimes cannot be solved exactly but only approached.

People expressed, "One does not always know how a dime can roll."

Note.-- Three planets, moving, in virtue of gravity acting on each other,,-- the evolution of weather are chaotic. I.e. small omens can cause large sequels in the mechanical movements of a billiard ball, planets, weather conditions.

2.-- *Related terms.*
The author quotes. We summarize.

a. -- *Determinism and predictability.*
The physical phenomenon of "chaos" does not disprove determinism. According to Maes: well on the contrary!

Determinism, understood as "ontological determinism," the axiom par excellence of modern physics, means a story structure: if VT (pre-sign, -- e.g., initial conditions), then necessarily VV (continuation).

Predictability. A determined process is perfectly predictable if one knows the totality of its conditions (factors, parameters, predicates).

Appl. model.-- The throwing of a die (omen) elicits a deterministic process or course (consequence). Yet it is a stochastic (guessing) process: "Few can predict how many eyes will be thrown" (a.c., 383). The VV is unpredictable.

b.-- *Theory of probability.*
The theory of probability, thanks to logical reasoning concerning processes where our knowledge of the sum of factors is incomplete, offers a way out: the unknown part of factors is exposed in the probabilities that are calculated ('Whole-ization'; *EL. 80; CS. 22* (Statistics).

c. -- *Models.* How to represent chaos?
1. As already mentioned: the mathematical 'dynamic' equations;
2. Fractals, whimsical geometric figures, can represent the "whimsical" nature of chaos.

Note.-- Complexity Science.-- Do we state, terminologically, that all the parts of a Buying 707 (over thirty thousand) are 'complicated' but that reversing the parts of an Italian spaghetti to an over-complicated result is valid. Translate "over-complicated" by "complex. -- Maes says that he does not know a good or generally accepted concept of 'complexity'. However, he does state that a (future and elaborated) theory of complexity may be able to capture "complex aspects" of chaos.

Note.-- turbulence theory.- 'Turbulent' or 'turbulent' phenomena -- one opens a water tap and a 'turbulent' jet of water sprays out -- seem chaotic. But one does not yet have an exact definition of the term 'turbulence'. Thus Maes a.c., 401.

Conclusion.-- Behold very succinctly the concept of chaos and related as defined by beta science (physics, i.e., mechanics).

(II) *The image (image impression) of scientific mechanics.*

1.-- *Beta scientists who "should know better"* (a.c., 397).
I. Prigogine, Les lois du chaos, (The laws of chaos), Paris, 1994, shows how Prigogine uses chaos to 'explain' irreversibility (irreversibility: passage of time). Others refer to a kind of 'generalized' irreversibility regarding chaotic developments.

Maes. -- A number of chaotic gradients are perfectly reversible. Irreversibility is a characteristic of macroscopic phenomena. "A billiard game can be chaotic but will never be irreversible". Chaos belongs to the domain of mechanics, reversibility especially to that of statistics.

Conclusion.-- STEM scientists argue among themselves.

2. -- *Alpha and gamma scientists "misunderstand".*
Thinkers like H. Bergson (1859/1941; philosopher of life) or AN. Whitehead (1861/1947; mathematician and thinker) rebelled against established natural science, -especially in its mechanicism (the universe is a cold machine) and its reductionism (the universe is reducible to a small number of concepts and laws). In their wake, others threw themselves into chaology.

J. Baudrillard (sociologist), G. Deleuze and F. Guattari (psychologists), J.Kristeva (linguist),-- M. Serres, J.-Fr. Lyotard, (philosophers),-- P. Davies, A. Ganoczy, A. Gesché (theologians),-- Fr. Capra (oriental mystic) -- with us G. Bodifée and J. van der Veken,-- they are all cited by Maes as models of the misunderstanding of the concept of chaos and related ones. Among other things, they see in chaology and related a radical break within classical mechanics and physics.

More to the point, they establish at least in part their own alpha and gamma sciences on that misunderstood chaology. Thus, some see in the natural science revolutionized by chaology a metaphysics! Cosmologist and physicist P. Davies: "It may seem bizarre, but in my opinion science offers a safer path to God than religion. (...). The far-reaching inferences of the 'new' physics".

Misunderstandings within the physicists. Misunderstandings between the beta scientists and the alpha and gamma scientists.--Which does not prevent basic concepts of chaology, applied analogously, from being innovative within the alpha and gamma sciences.

Sample 59.-- Steering thinking in alpha culture.

Bibl. sample: *E.W. Beth, Philosophy of Nature*, Gorinchem, 1948, 35vv.. -- "Kubernètikè technè" skill concerning steering (hence 'cybernetics') occurs as a term several times in *Platon*'s works (e.g. *Gorg. 511d*).

Herakleitos.

Herakleitos of Ephesos (-535/-465) says in an excerpt, "All human laws feed on the one divine law." -- Comment by Beth: that statement is the articulation of cosmic harmony, which structures a course.

1. There is the normal, ordered by norms or rules, course.

2. At some point, comes the abnormality or abnormal course.

3. Whereupon - necessarily - the restoration of the norm follows.

Orderly (*E.L. 29*): order / disorder / restored order.

In the wake of *H. Kelsen, Die Entstehung des Kausalgesetzes aus dem Vergeltungsprinzip*, (The emergence of the law of causation from the principle of retribution), in: Erkenntnis 8 (1939), Beth says the order (legality, legal order) is equally valid in inanimate, living and human nature.

Note.-- For ancient Egypt, W.B. Kristensen confirms this in *W.B. Kristensen et al, Antique and Modern Cosmology*, Amsterdam, 1941.

Logical.

"If laws are broken, then necessarily, no matter what, penalties occur." -- Platon: "All these things become causes of disease (sanctions) when the blood does not feed from food and drink (order) but gets its 'weight' from wrong things (disorder) against the laws of nature." (Timaios 32).

Aristotle, Politika V: 5, speaking of constitutions:

1. there is 'telos' (purpose (orientation));

2. 'par.,ek.basis' (deviation from the goal);

3. 'ep.an.orthosis' (also: 'rhuthmosis') (recovery).

Note.-- Reread EL 35 (Zedeles) .-- Order of conscience. **1.2.** Father's murder (deviation). **3.** Judgment of a deity (restoration).

G. Daniëls, Religious Historical Study on Herodotus, Antw. / Nijmeg., 1946, talks about the 'kuklos', cycle, in nature:

1. many things (animals, states) start small and grow orderly;

2. sometimes, however, they reach a state of "hubris," borderline deviance;

3. thereafter follows, in Herodotos's faithful interpretation, a divine restoration (which may take the form of complete ruin if need be.

As Beth says: such orderliness is still found in R.W. Emerson (1803/1882) et al.

Sample 60.-- Steering thinking in alpha culture.

Bibl. sample: H. Peels, The Vengeance of God (*The meaning of the root NQM and the function of the NQM - texts in the context of the Old Testament revelation of God*), Zoetermeer, 1992.

In 59 texts, the term nqm, "revenge," means restoration of justice after deviation. In 85% of these texts, God is the subject of the NQM act. In other words, NQM means judgment from God.

As an aside, we still find this in the theological term "vengeful sin" (the restoration of justice is still taking place in this world).

The reductive reasoning regarding the "cause" of evil.
So Ps. 53 (52): 6: "Suddenly the wicked shall be smitten with fear, -- without 'cause' of fear." So Ps. 88 (87): 15: "By what / why, Yahweh, are you repelling my soul?" -- The fear, the being cast out by God are 'signs' (*EL 06*) of disorder and the sanction that will follow.-- But more often than not, the disorder reason is and remains an 'X', an unknown.

Appl. model.-- *Bibl. sample: H.-J. Schoeps, On Man*, Utr./ Antw.,1966 119/141 (Kafka: faith in a tragic position). Schoeps knew Kafka (1883/1924; novelist) well.

1.-- *Odradeck.*
This Slavic term means "gone beyond the law." Today's "dogmatic" (Kafkaesque term for "deviant") man lives more and more like a thing,---so e.g., like a spool of thread within an immeasurable cultural machine: he is no longer an "I" but an "it," a thing.

2.-- *Franz Kafka's interpretation.*
"If Yahweh's order and if deviation from that order, then doom situation. Well, calamity ('odradeck' = a thing). So somewhere deviation from Yahweh's order".

The Talmud.-- The Mishna and the Gemara, holy books, of the Jews predict, "One day, in the end times, the faces of men will be like the faces of dogs." Well, Kafka has the impression that that end time is here: our culture is becoming "dog-like! It becomes 'absurd', contrary to what one would normally expect,--'deviated' from the law of the Jews.

The mysterious guilt.-- There must have been, in earlier days, a mistake, -- a deviation from God's order. If not, the present cultural disorder is incomprehensible, 'absurd'.
But throughout his life Kafka sought that hiding, "occult," guilt. She remained to him an X, an unknown. The sufficient reason he finds is not unless vague.

Sample 61.-- Steering thinking in beta and gamma sciences.
Norbert Wiener (1894/1964).

The ancient theory of order, in its steering theory variant, which governs "sacred history" and "nature", suddenly experiences its revival: Wiener's encounter - as a mathematician - with A. Rosenblueth, a neurophysiologist, and his activities under the direction of W. Weaver (automation), lead in 1948 to the publication of his Cybernetics in Paris. With this, control science entered the domain of the beta - and gamma - sciences. But in an analogous way.

Feedback.

Wiener defines "cybernetics" as the theory concerning feedback. Indeed: Goal-orientation (order);**1. 2.** Deviation (disorder); **3.**Feedback (restoration of goal-orientation).

Self-regulation.

Bibl. sample: J. Piaget, Le structuralisme, Paris, 1968.
Steering science prioritizes a dynamic system:
a. A totality,
b. Equipped with self-regulation ('autoréglage')
c. Who controls its transformations ('transformations').

This posits that such a system is, on the one hand, open, i.e., subject, "sensitive: to influences (conditions, parameters, factors) from outside, yet remains quasi-closed ("une certaine fermeture") on the other.

Mathematical describability.

That aspect in particular reestablishes traditional steering science.
John van Neumann, The nervous system as a computer, Rotterdam, 1966, xix, says: "the mathematical point of view" means that, in addition to the general mathematical methods, logical and statistical methods are employed.

A geometric model.

Bibl. sample: D. Ellis / Fr. Ludwig, Systems Philosophy, Englewood Cliffs, N.J., 1962. The diagram herewith shows all the sub-concepts that make up the total concept.

```
supply (input) --> system --> outlet (output) -->
                 ^                                          v
              <--- feedback (feedback) <------
```
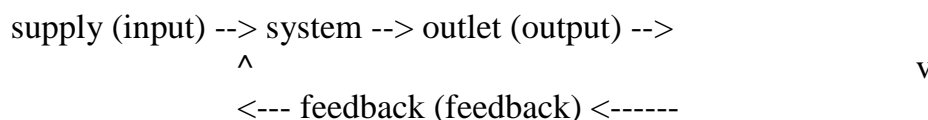
Consider a very simple model of dynamic system, i.e., a coffee grinder: the "input" is the coffee beans; the "output" is the ground coffee.

Matter / energy / information.

This basic triad in the beta and gamma sciences applies here. Ellis/ Ludwig: a system can transform, "process" matter (a meat grinder), energy (a heating appliance) or information (a computer).

Appl. Mod.-- With *L. von Bertalanffy, Robots, men and Minds*, New York, 1967, we argue that dynamic systems with self-regulation can be purely mechanical, biological, psychological and sociological. Therefore, there is only analogy between these different levels 's.

(1). *Regulator.*

That part of a device which makes its gait regular is called 'regulator' or 'regulator'. -- thus the pendulum in a clockwork, the 'agitation' in a watch, the governor and flywheel in the steam engine.

J. Watt (1736/1819) is known for the latter model: a signal indicating the speed of the steam engine is transmitted in such a ' way to a component that amplifies a force that, if the machine runs faster, then the steam supply is reduced. Immediately the speed is kept unchanged. The controller, to control the speed, feeds back information (signal).

(2)1. *Homeostasis.*

Homeostasis responds self-regulatory to internal influences. "Le milieu intérieur" ("The inner environment"), (Cl. Bernard (1812/1878)) is held unchanged.

Thus e.g. concerning acidity, water balance, body temperature, metabolism.-- Cfr *W.B. Cannon, Wisdom of the Body*, London, 1932. An extensive literature follows in its wake. Cfr. *G. Pask, Introduction to cybernetics*, Utr. /Antw., 1965, 10/11.

(2)2. *Reflex.*

The reflex responds self-regulatory to external influences.--- Magendie, in 1817, defined "reflex" as an activity caused by a disturbance which propagates itself - via the posterior or dorsal nervous system - and is thence reflected - via the anterior or ventral nerve roots - to its starting point ((the source of) the disturbance). There it weakens the original disturbance, makes it stop or even makes it turn into its opposite.

As an aside, the reflex or involuntary response to a nerve stimulus became, in the early XXth century, the theme of I.P. Pavlov's experimental study (reflexology),

(3). *Intentionality.*

Reread CS 39v.-- Ellis/Sagarin's ABC theory of personality secretly boils down to something self-regulating. The sane mind processes the influences correctly; the neurotic mind processes them poorly. 'A' are the influences; 'B' is the intentional system; 'C' is the drain or output.

But as stated above only analogous to the previous peels or levels' of systems.

Sample 62.-- Computer Thinking.
Bibl. sample: --- *P. Heinckiens, Programming is more than typing*, in: *Eos* 6 (1989): 9 (Sept.) 69/73;

-- *E. De Corte / L. Verschaffel, Learning to program: vehicle for skills*? in: Our Alma Mater 1990: 1 (Feb.), 4/35.

A definition. An ordinator or computer is a device ('machine') that processes 'data' in a purposeful way through an algorithmic sequence of operations.-- In other words: a kind of dynamic system.

The computer system. Two larger sections.
1. The actual computer (with the keyboard in front).
2. The background is peripherals.
As a dynamic system, the ordinator exhibits the keyboard as input machine where the monitor (with e.g. the screen) and the printer are output machines.

The floppy disk.
This is a disk on which numerous data are stored (the data carrier): immediately we have the memory, i.e. the disk as a storage unit for data. The disk is both an input and output unit.

Conclusion. - Feed, memory, output are the three "functions" (roles) of the diskette unit.

Equipment and software.
Hardware (matériel) and software (logiciel).- Two components master the "math" with the "calculator".
a. *Equipment.* -- This is the totality of the material components: electromechanical and electronic parts, cables and circuits for electrical power and interconnections,-- a central memory and auxiliary memories, input and output organs for the information.

b. *Software*.-- This is the totality of the programs and associated documentation material (manuals, flowcharts for computer operation).

Both together.
Ph. Davis/R. Hersh, L'univers mathématique, (The mathematical universe), Paris, 365/369 (Modèles mathématiques, ordinateurs et platonisme), points out that true informational "arithmetic" (working with a computer or calculator) includes both aspects. Only if and equipment and software are in perfect order can the computer be expected to produce "the absolute truth." -- The authors underline: "Which is far from always the case"! That is why we speak of a computer system: it is a "totum physicum" (as the Middle Ages would say), i.e. a coherent whole.

Sample 63.-- A comparison.

Do we assume an easy model, the washing machine, to define the original, the calculator.

1.-- *The washing machine.*

In particular, the automatic washing machine. As we saw there are more than one type of dynamic systems the washing machine processes matter, the laundry.

The algorithm.

Cfr. *EL 52* (*Model of algorithm*); (*51Definition of algorithm*).

An algorithm is a kind of classification (*EL 37: Collective classification*): the totality of the set of operations that constitute the essence of the computer operation must be found again in that enumeration and only that totality (what makes it define).

The washing algorithm includes an initial situation, intermediate situations (a sequence, commands; i.e. 'instructions '), an final situation. It is a process. And a purposeful process or event at that.

a. The clothes to be washed are placed in the drum. The electric current is turned on. The washing powder is put in the compartment. The water supply is opened.

b. Depending on the nature of the laundry, an appropriate washing program (in the built-in microprocessor (a chip with a logical structure and memory: if one wants a computer in miniature)) is deployed: a button is pressed that selects one of many washing programs. The machine executes this program. The waste and the rinse water are discharged.

c. End result: the clean laundry is removed from the drum.

2.-- *The computer.*

Analogy - partial similarity or consistency / partial difference or gap - is the basis of the comparative definition.

Similarity.

According to the structure just mentioned, the computer also works: input of data (information) / processing according to a program / output.

Difference.

The washing machine is to a great extent pre-programmed. The computer is much less pre-programmed : the user himself can - to a certain extent - enter a program, i.e. starting from a task (given + problem) program as a solution.

Note.-- One can see that the computer is a.k.a. redoing all that we have learned since the beginning of this course on "logic"!

Sample 64.-- Computational thinking : applied logic.

Five main aspects.

According to Dr. L. Klingen (Helmholtz - Gymnasium, Bonn), computer science includes five aspects.

1. Understanding how to use the equipment.

2.1. Understanding the core of the thought process, the algorithm.

2.2. Understanding how to structure the data to be entered (= data, information).

2.3. Understanding how to apply to concrete cases (= applicative models).

3. Understanding how to shield against data intrusions.

1.-- *The opinion of Prof Weizenbaum (m.i.t.).*

At some American universities, a few years back, every student had to have a microcomputer.

Weizenbaum disagrees. He strongly wants to prevent a curriculum from being viewed exclusively from the axiom : "It must be programmable".

Note.-- Reread *CS 54* (Axiomatic induction). I.e.: Weizenbaum does not want the understanding of the data to be reduced to "What can I program about this?".

A lot can be taught in a very good way without a computer!

J. Ellul, Le bluff technologique, (The technological bluff,), Paris, 1988, says that there is a danger that one - once whole and molded into the computer mindset - will become closed to any other form of thinking. Ellul calls this "computer terrorism.

2.-- *The opinion of De Corte / Verschaffel.*

Learning to program as a vehicle for acquiring thinking skills presupposes some assumptions or conditions.

Thus: basic insights into the theme to be treated. Whoever wants to solve a legal question - a divorce for example - with all the known and 'impossible' complications connected to it, should know the law and legal customs very well. If not, he will insert incorrect data into the program!

So: self-knowledge! Reread e.g. *CS 47* (*Peirce's four forms of opinion*)! In Other words: "Am I biased (opinionated, straightforward, preferential) or objective (scientific)? The authors call this "the aspect of 'metacognition' (knowledge of one's own knowledge))".

Of course, they emphasize the rigorous logical approach, such as e.g. the generalized method etc.

Sample 65.-- The essence of programming.
Definition.

Programming is converting the task into a logically correct sequence of elementary (= irreducible), for the type of computer 'understandable' 'steps' (actions). In other words: forming an algorithm.

Note.-- Before deploying the computer, one sits down at the table with a pen and paper: that too is already "programming"!

Algorithmics.

"Algorithmic thinking is the hard core of computer science". (*H. Heers / H. Jans, Computer science and computing in education*, in: Streven 1984: July, 928/940).-- One defines a scenario (sequence) that includes the whole and only the whole of irreducible operations.

Typology.-- One speaks of "structures" of algorithms. For example, there are at least three.

a. -- *Iterative algorithm.*

The monotonous repetition of the same thing.-- Model: a, a, a, a, ... -- The command (instruction, command) is simply repeated a number of times.

Appl. mod. -- One wants to get a list of twenty names from the stock (memory) of a computer with names : one presses "enter a name" twenty times.

b.-- *sequential algorithm.*

Non-single sequence.-- Model: first a, then b, onward c, then d etc..

Appl. mod. -- Putting the coffee in the computer.-- Initial situation: I go to the coffee maker. - Take the coffee pot. Walk to the tap. Fill the jug with water. Etc. -- Up to the end situation.

c.-- *Selective algorithm.*

A plurality of possible choices from which to choose.-- Model: "If model, then yes; if counter-model, then no."

Appl. model.-- In the ministry there is someone who has to calculate a pension in the computer: the whole and only the whole of all the elements that make up the pension sum is the theme.

Thus: "Does entitled person belong to one of the categories (laborer, employee, self-employed) yes or no? If model, then yes; if counter model, then no". "Did the entitled person have a full or incomplete career? If incomplete, then ...".

One sees it clearly: algorithms, if logically rigorous, are definitions by enumerations after one has correctly classified the topic (*EL 37*).

Sample 66.-- Neuronal network.

Since 1960, especially since 1985, computer scientists (USA, Japan, Switzerland among others) have been experimenting with a new type of ordinators: neuron network works.-- The established computer contains a program (microprocessor). A neuron network does not.

1.-- *The human brain.*

A neuron is a nerve cell with its neurite and its dendrites. Our brains contain about a hundred billion of them. Thanks in part to astrocytes, these are in constant interaction.

2.-- *The neuronal network.*

In the absence of a program, all that remains is a set of elements - artificial neurons - which interact by means of electrical currents. And this with a sensitivity threshold that can change.

Appl. mod.-- Stated: such a network of neurons. One gives it the <u>instruction</u> "Look up the word 'cookie' in a text". -- To this, a neuronal network responds somewhat like a human: the more a word resembles 'cookie' (the one searched for) the more the network becomes - electrically, of course - excited. Which is an "if, then," relationship.

Conclusion.-- The algorithms in the established ordinator (see *CS 74*) are more transparent. The algorithm in a neural network comes across, even to specialists, as "eccentric" it has its own selectivity.

Typology.-- Neuron networks are suitable for key phenomena of robotics.

Note.-- The Czech word "robot" means "man of art. Now it means "working machine. Robots that look artificially as well as robots that edit words are served with neuron networks.

Man and Machine.

Bibl. sample: *Cedos, Cerveau humain: "Maman, enco un miscui",* ("Maman, encore un biscuit", "Mom, one more cookie.") in: *Jounal de Genève* 10.12.90.-- A two-year-old baby recognizes in an instant a cookie ('miscui' = 'cookie') that barely shows its edge in the package. Until now, the most powerful computer of the classic type has not succeeded in doing so.

A baby is a mind that needs only a minimum of perceptual data to recognize. The classical computer, however, is an inanimate machine that responds only to that for which it has been made, -- arranged, programmed, by man. A mindless machine.

Sample 67.-- Chemistry and Lhasa computer.

Bibl. sample: B. *Faringa/ R. Kellogg, Decomposing into factors* (*Nobel Prize in Chemistry 1990*), in: *Nature and Technology* 58 (1990):12(Dec.), 832/839.

a.-- *Synthesis.*

E. Corey, with some twenty collaborators, worked on the creation from last elements (often compounds with carbon atoms) -- in computer language: bottom up -- of gibberellic acid, a complex plant hormone.-- This is a preliminary stage to manipulating biological traits.

b. -- *retrosynthesis*

Corey broadened the synthesis method.

1. *Decomposition:* complicated structures he laid apart until he stumbled upon the smaller "building blocks."-- In computer language : top down (the opposite of creation).

2. *Creation*: resynthesizes such compounds.

The role of the computer.

The Lhasa (Logical Heuristics Applied to Synthetic Analysis) is a computer widely used in universities and industrial laboratories around the planet (including in drug research).

Note.-- Since 1959 Corey has been applying that method at Harvard University: precisely that computer logic on synthesis was one of the main reasons for his 1990 Nobel Prize.

c.-- *Total synthesis.*

The creation of natural substances starting from simple molecular components is called "total synthesis.

As an aside, a 'natural substance' is an organic compound of natural origin. The various atoms from which a hormone or an antibiotic is combined -- *EL 28 (Stoicheiosis); 29 (Combinatorics)* --, their interactions, the 'functional' (playing a role) groups in them, the spatial structures,-- all this comes into play in total synthesis.

Algorithmic.

Appl. model.-- Corey thus synthesized ginkgolide-B, a complex compound found in ginkgo biloba, the well-known tree of life (in Chinese phytotherapy (plant medicine) a remedy for asthma and inflammation). This was done by decomposing step by step into 'synthones' (final building blocks or 'elements') - retor synthesis - and by combining in thirty-seven steps.

So one sees that the algorithmic method, known by all kitchen specialists, is getting an unsuspected application in the (bio)chemical field but not without the "core of computer logic", the algorithm!

Sample 68.-- The rhetorical argument.

Bibl. sample: --- R. Barthes, *L'aventure sémiologique*, Paris, 1985, 130/136 (*L'enthymème*);

-- *U. Eco, La structure absente*, (The missing structure), Paris, 1984, 154ss... -- 'Enthumèma', literally: "what one has in the mind".

1. -- *The quintilian meaning.*
Quintilian (35/96), Roman 'rhetor' rhetoric teacher (*Institutio oratoria* (93/96)), called 'enthymeem' "that reasoning in which either one prepositional phrase or the postpositional phrase is omitted (under understood in spirit)."

Appl. model.
March 1965. In Moscow, Chinese students demonstrate in front of the VSA embassy. The demonstration is suppressed by the police. Protest by the Chinese government.-- Soviet epicheirema.-- *EL 88* (*Epicheirèma*).--

Sentence 1 (major).-- All countries respect diplomatic norms.-- Proof: ye Chinese respect them also.

Sentence 2 (minor).-- Well, Chinese students violated those standards.-- Evidence: the record of the demonstration including swearing and other offenses.

Conclusion. Unspoken because "obvious.

Note -- Sentence 1 articulates an "eikos," a rule with exceptions (*EL 06*).

2. -- *The Aristotelian meaning.*
Aristotle distinguishes three types of reasoning.

1.1.-- *The apodictic, irrefutable reasoning.*
Not open to any counter-reasoning! From (initial) premises which are themselves considered irrefutable, one concludes to irrefutable derivations in a fallible manner.-- That is what Aristotle called "the ideal of science."

1.2.-- *The 'dialectic', open to counter-reasoning.*
'Dialectical' here means "susceptible to arguments for and against." -- From (initial) premises which are themselves only probable (= open to firm argument), one draws only probable conclusions.

Note.-- CS 57 (Zenon).-- "Neither thou nor I prove apodictically what thou dost assert (substantiated by serious yet non-refutable arguments). 'Dialectical' is a dialogue when both parties can present serious arguments concerning the same topic.

2. -- *The "rhetorical" reasoning or "enthymeem".*
Here logic is subordinated to persuasion, i.e. convincing an audience or interlocutor(s) if necessary with refutable arguments.

Sample 69.-- Rhetorical philosophy?

Bibl. sample: -- *P. Fentener, Reflection in business,* in: *Philosophy Magazine* No. 1 (October 1992);

-- *N. Dufour, Première vaudoise: un ex-professeur ouvre son cabinet de consultation philosophique*, (an ex-professor opens his philosophical consulting room), in: *Journ.d.Genève / Gazette de Lausanne* 06.03.1996.

1.-- *Business Philosophy.*

Fentener notes that managers to be taken seriously are making annual millions in profits thanks to philosophical reflection. He himself is one of them. This is then called "corporate philosophy" (philosophizing within a production process.

Note.-- No matter how honestly meant such an interpretation of philosophizing is and remains rhetorical first and foremost.

2.-- *Council philosophy.*

The ancient philosophers, though sometimes in very different ways, saw the real purpose of philosophizing in "virtue" ("aretè"), i.e., the ability to solve life's problems.

A. Contesse (1933/ ...), professor once in Lausanne, opened a consultation cabinet 27.02.1996 in Apples (VD).-- There he expects young people who do not know what direction to take,-- forty-somethings who no longer see the point either in profession or in private life,-- third-age people who experience a great inner emptiness in spite of a successful life due to sacrifices.-- He wants to tackle the problems along the reflective side. He calls this "a philosophical conversation". -- Who does not think here of Socrates in the then Athens who, in the streets and in the "marketplace," had philosophical conversations?

Note.-- N. Dufour notes that "thinkers specialized in doubting" thus express their objections following Contesse's outline .

Opm.-- *H. De Dijn, The intellectual is dead. Long live the intellectual*. in: *Our Alma Mater* 50 (1996): 1 (Feb.), 135/156, mentions as one type of intellectual those who "want to transcend the factually given more and more by standing critically all the time,-- aiming at an ideal that can never be reached." -- They are "specialized in doubt". Not surprisingly, philosophizing often leads to deconstructions of all kinds!

A Fentener, a Contesse and others however do (re)construct as *CS 59* teaches us when the "dogmatic" thinkers were discussed who were aiming at "something positive" (E.W. Beth).

Sample 70.-- Philosophy at Childhood Level.

We are (or rather were) 1974.-- Matthew Lipman, American thinker, founds an Institute to promote philosophy for children. With its own magazine "Thinking".

The occasion.

Reread *EL 38v.* (*Society Criticism*) and ye shall understand Lipman 's occasion: he observed that:

1. In young children, before they are "affected" by social criticism, "an original thinking, spontaneous and contemplative," is present;

2. The turbulent students / student women in the sixties contested without usually being able to at least have a real reasoning and (therefore) not being able to detect valid exchange solutions for the established society and its heavily weighted flaws.

The solution.

Behold the fact facing Lipman.-- He saw the solution in reading stories and discussing them together, as in the philosophy schools of ancient Greece, from a logical point of view.

Cfr. *EL 35*, where as textology an ancient 'story' is touched upon briefly and *CS 67*, where the cybernetic aspect is highlighted. The lesson in morals which assumes the structure of a steering process: behold the essence. What a child can understand in a narrative way.

Cfr also *EL 54*, where stories are brought up in court and tested for their logical value: don't think that children, talking together about the three stories quoted there, will not understand the tendentious (the rhetorical) of the three stories!

Or reread *EL 92*, where, together with the teacher, children find a feather and "debate" the totality to which that feather belongs and thus practically teach the lemmatic-analytic method. Which is veral induction. Here it is a lived story!

Note.-- *Jostein Gaarder, The World of Sofie* (Novel on the History of Philosophy), Antwerp, Houtekiet, 1994.-- It is a philosophy course in novel form with platonic dialogues or letters: Alberto Knox introduces fourteen-year-old Sofie to the history of philosophy from Thales of Miletos to Jean-Paul Sartre.

By early 1996, some 700,000 copies had gone off the counter. Meanwhile, it seems that Lipman's scheme has worldwide resonance.

Sample 71.-- Literary Rhetoric.

1.1.-- *Une paix royale.*
1995.-- *P. Mertens*, Walloon success writer in Paris, publishes *Une paix royale* (A royal peace), (Seuil).-- The author meets in the vicinity of a palace a princess looking for a runaway deer. Thus begins the book.-- Is meant Argenteuil where Princess Lilian and her son Alexander are staying.

Bias models.
1. The prince becomes a greaser, a gambling addict, a cognac slurper. To become a prince, he was swapped with a real royal baby at the time in the maternity hospital.
2. The princess portrays King Baudouin as someone who has never been in love, never been unhappy,--as a virtually illiterate who was absorbed only in comic strips. Behold what this "novel" gives us!

1.2.-- *Reception.*
Princess Lilian goes to a judge in Paris, who rules that Mertens applied "a remarkably reprehensible procedure" of defaming people who are still alive: a purged reprint is legally imposed.

Mertens himself defines the conviction as "a grim precedent that can also affect other writers." For "the disposition of rights is an attack on the right to free expression." In the name of this permissively stated axiom, Mertens justifies - what he labels - "an innocent literary procedure."

In an open letter to Le Monde, celebrities such as Carlos Fuentes, Milan Kundera, Salman Rushdie, Jorge Semprun and others ask that Princess Lilian withdraw her complaint.

1996: royal rest.-- Toth-EPO publishes the book in the unedited version. Justification: "It is clearly fiction but Mertens makes the book more convincing by interweaving truth and fiction." In other words: mere fiction would develop less rhetorical power!

2.-- *Literary genre.*
Mertens and Toth - EPA et al. are not isolated cases.

January 1996: Washington-based *Anonymous, Primary Colors* (Random House) is published in which President Bill Clinton, disguised as one Jack Stanton, and first lady Hillary are indirectly described as involved in various sex scandals, among other things.

One sees: it becomes its own literary type, which in virtue of slanders the living and mixes fabrication and facts "works more convincingly" and certainly for the publisher "brings in more money".