8.3. Elements of logic , 1st year, 1990/1991, 167 p.

Note: This course 8.3. follows courses 8.1. Elements of Thinking and Methodology and 8.2. Elements of harmology. Page and sample numbers continue as before.

Contents and study notes : see p. 365

Sample 26.-- Logic: introduction. (202/ 210)

Logical reasoning, i.e. valid reasoning, presupposes:

a. ontology as a doctrine concerning reality in any form (including the merely phantasmatic);

b. harmology as a doctrine of ordering realities.

Along the way we have already developed its twin foundations and, immediately, the basic concepts of logic, which in this sense is not an independent science, but an offshoot of both 'foundations' the ontology and the harmology. It is because 'being(de)', the Antique name for "all that is real", is itself somewhere logical, that we can reason logically about that reality.

It is because the "being" - the realities - are themselves logically ordered or at least orderly somewhere that we can reason about those realities in an ordered way.

I.M. Bochenski: The three waves of thought.

I.M. Bochensky, O.P, (1902/1995), renowned Sovietologist, who situates himself in Analytic philosophy -- although as a Dominican he passes for 'Thomist' (follower of S.Thomas Aquinas, the Middle Ages top figure), says that the history of logic -- which he, to a large extent identifies with formalized or, at least formalizable logic (see above ETM -- HARM 85: logical syntax) -- shows "three waves".

(1) Antique logic

- IVth/IIIrd century BC -,

(2) The mid-century logic

- XIIth/ XIIIth century (the flowering of medieval philosophy) -,

(3) the actual, thematized logic

- since + 1850 - constitute the three "waves" of revival.

Between these three there are long periods of neglect, indeed of great ignorance of logic. Thus the modern period, of which he says: "The Modern era - since Descartes - is so terribly ignorant that any 'Modern' philosopher - Gottfr. Wilhelm Leibniz (1646/1716), 'one of the greatest cartesianizing Rationalists' excepted - would have failed in his first-year 'Logic' exam".

Now reread ETM 40, where Modern Thought is briefly outlined, -- This cobbled-together remark -- designation rather -- from a specialist on logic and logic history is thought-provoking.

The dual origins of Western logic.

Bibl. st.: R. Caratini, *La philosophie*, II (*Thèmes: Logique et Epistémologie*), (La philosophie, II (Thèmes: Logique et Epistémologie) , Paris, Seghers, 1984, 29.-- "The Greeks founded the theory of thought." -- This statement applies, of course, only to our Western logic.

A. Dialectics, (eristics).

Reread ETM 08 (Parmenides,-- Zenon),- 86 (antilogia, -- eristics), 110, 113;-- 154 (redoubting);-- 158 (dialectics). This is to have the concepts of 'dialectics' and 'eristics '(redoubt) well in mind,.

The skill concerning conversations, dialogues -- conduct with the premise of avoiding any contradiction (ETM 70) arose among the Eleates,-- especially in the actions of Zenon of Elea, who resides in Athens around -450.

Protosophistics. First Sophistics (-450/-350,-- one of the pre-Socratic schools) bent the intentions of a Zenon to a great extent.

They were out to gain power and money, and instead of rigorously logical conversations, they used rhetoric, understood as seduction through words and dialogue.

Platonism. Parallel to the Paleopythagoreans of the time, who disagreed with the treacherous side of the Sophists, Platon of Athens (-427/-347; founder of the Academy) stepped up. He deepened the established dialectic, resp. eristics into what became Platonism.

According to Caratini, in his last dialogues, he felt the need for a kind of "formalization" of thought.

B. Analytical.

This name for "logic" was introduced by Platon's greatest student, Aristotle of Stageira (-384/-322).

a. He makes, first, the theory of thought an independent subject science.

Name: 'organon', -- literally: (thinking) instrument. Six treatises. Object: understanding, judgment, reasoning. This three-part division is still prevalent to our days.

Note.-- Since the logicians, this logic has been called "classical formal logic". It became prevalent in education until our century.

b. Triangulation of the dialectic of the time (eristics).

Aristotle distinguishes three types of reasoning (dialoguing).

b.1. Apodictic reasoning

These postulate prepositions ('premises') that are objectively true. He studies them in the two analytics, (called First and Second Analytic),-- in ancient Greek 'analutika'

b.2.a. 'Dialectical' reasoning

These put forward presuppositions that are only probable (ETM 46). He analyzes them in what he calls, in a sense strictly his own, "dialectics."- These include, e.g., scientific "hypotheses" that have not yet been proven.

b.2.b. Rhetorical Reasoning

They put forward sentences -- objectively true, probable, uncertain -- with the objective of persuading fellow human beings, i.e., influencing them toward some predetermined goal (which is pragmatics; ETM--harm 85; 98).

C.-- Logic.

The philosophers of the stoa (colonnade), Stoics or stoics (Zenon of Kition (Lat.: Citium) (-336/-264) is the founder), with their Megarian theory of thought (Philon, Diodoros), again change the name ("logika theorèmata", logical doctrines): in time it becomes "logike", which will become our "logic". Let us say from +/- 310, date when the school begins to get off the ground.

Note -- As G. Jacoby, *Die Ansprüche der Logistiker auf die logik und ihre Geschichtschreibung*, (The claims of logisticians on the logics and their historiography), Stuttgart, 1962, 74ff., explains, in detail, the logic of the Stoics was by no means yet the forerunner of present-day logics (formalized logic), but it did have a very distinctive, non-Platonic and non-Aristotelian nature of being.

What Caratini does not mention.

The three denominations, with the three interpretations of thought, as Caratini presents them, are historical fact. But he forgets the Paleopythagoreans, in whom the doctrine of thought does not display a "dialectical-eristic" nature, but a mathematical interpretation.-- The aging Platon tended more and more toward Paleopythagorean thinking.

O. Willmann, *Abriss der Philosophie*, Wien, 1959-5, 13/18 (*Der Ursprung unserer Logik*), (The origin of our logic), says: "For the Pythagoreans, the mathematical method was an introductory schooling for the logical method.

As early as Archutas of Taras (Archytas of Tarantum (-445/ -395), a distinguished Pythagorean, began constructing thought operations. Thus, e.g., definitions (note: the sharp articulation of a thought content): "Wind still is the air mass at rest"; "Sea at rest is the halt of the waves". Such definitions (determinations of being) found, among later logicians, acclaim". (o.c.,14).

Note.-- Immediately it is abundantly clear that the Antique Greek theory of thought has not one -- the dialogical -- but two origins, viz, the dialogical and the mathematical reasoning.

Epistemology is not logic.

G. Jacoby, *Die Ansprüche*, 80ff. (*Folgebeziehungen*), (Follow-up relations), discusses the thorough distinction between:

(i) combinatorics (ETM-harm 145) of sentences and

(ii) logical relationship of sentences.

He does this on the basis of Stoic models. We reproduce, with commentary.

Now reread ETM first - harm 80: entailment / implication

We saw there that, thoroughly speaking, there are two main types of encompassing (inheritance):

a. "Something comprises overall (total identity) itself" (in logistic language "if a, then a");

b. "Something partially (analogy, partial identity) encompasses something else" (in logistic language: "if a, then e.g. b").

The analogical embodiment, as we saw again and again, can be either metaphorical or metonymic (similarity or coherence; collection or system as a basis).-- That is logical coherence,--as Platon, Aristotle formulated it.

Let us now look at what the Stoics made of it.

Jacoby gives models not of Stoics, but in Stoic spirit. Cfr. o.c., 82, 83: 'sunaktikon' encompassing (in the Stoic sense then).

a.-- "If it is day, then the sun shines".

Stoic analysis:

Pre-sentence (= FS, First Sentence) true; post-sentence (= AS, After Sentence) true. Both are empirically, yes, experimentally determinable. Which is epistemological.

Aristotelian analysis:

The connection is not logically 'valid' because both sentences are 'true' (testable, findable; ETM 09; 32 (epistemology)), but because - in, Aristotelian language expressed - an enthumema, an unspoken presupposition (Platonic: 'hypothesis' (ETM 02, 37, 44, 47), is at work, i.e. "if sunshine, then day" (as representing a causal relationship). If that enthymematic (unspoken) preposition is true, then the statement "if day (consequence), then sunshine (cause)" is logically valid; otherwise it is not.

Which presupposes a thoroughly different conception of logic, of course. The Stoics are indeed (whatever Jacoby may say) not so far from combinatorial logic.

b.-- "If the earth flies, it has wings".
Stoic analysis:
FS (First Sentence) = false; AS (After Sentence) = false.

Aristotelian analysis: if there is an enthymeme (unspoken presupposition) at work as e.g. "if fly, then wings as necessary instrument", then the paradoxical (ETM--HARM 172: first, Antique meaning) sentence is Logically valid, because true logic, in the Platonic-Aristotelian sense, looks only at the 'If/then' connection, apart from truth or falsity of the sentences (which is an epistemological matter and not a logical one).

Note.-- It is precisely because of this that true logic in the Socratic sense speaks not in categorical, but in hypothetical sentences.

c.-- "If the earth flies, then it exists".
Stoic analysis:
(understand partly combinatorial, partly epistemological). FS = false; AS = true. One does not follow logically from the other, but one first combines two sentences in "if/then" form and then tests (verifies/falsifies) whether they correspond to a reality (which is epistemology).

Socratic Analysis: only if the enthymematic premise "only if exist, then can fly" holds, then the implication "if the earth flies, then it exists" is logically valid.

Note.-- Analogous case: "Je pense; donc, je suis" (R. Descartes). Only if the enthymematic premise "if and only if something exists, it can also think" holds, then "I think, therefore I exist" is logically valid. In the Platonic-Aristotelian sense, that is.

d.-- "If the earth exists, it flies".
Stoic analysis:
FS = true; AS = false (false), -- where 'true' means 'testable', 'findable' and false means 'untestable', 'un-findable' (= epistemological categories (ETM 36: cf. 107, 149)).

Socratic analysis: the full sentence is logically invalid, -- not because after sentence "then it flies" is falsifiable ('false'), but because the enthymematic premise "if something exists, then it flies" is simply not there.

Was said:
a. if something exists, it flies;
b. well, the earth exists; therefore, it flies, then the sentence "if the earth exists, then it flies"-seen purely logically-would be valid. But the Stoic sentence does not mention the enthymeme.

Determination of Being (definition).-- Step by step we begin to grasp accurately what traditional logic is.

1. It grows amidst dialogues, resp. eristic discussions, and mathematical proofs;

2. First it is called "dialectic" ("eristics"), then "analytic/ dialectic/ rhetoric" (with Aristotle) to be called, with the Stoics, "logikè.

3. It stands or falls with the entailment defined by the Great Sovereigns, Platon and especially Aristotle - "if/then", "entailment/ entailment", 'entailment'-; admittedly, it presupposes relations, for the entailment - articulable in the hypothetical sentence - is a type of relation, viz. the logically valid relation.

Charles Lahr, S.J., *Cours de philosophie*, I (*Psychologie/ Logique*), Paris, 1933-27, 485/718.—The author begins as follows: "Formal logic is the science concerning the rules which the human mind must apply if it is to remain - in its thinking operations - consistent with itself and avoid contradiction (contradiction)."

Well, the three thinking operations inherent to all thinking are understanding, judgment, reasoning.

Note.-- There is one direction in philosophy today in which these three - understanding, judgment, reasoning - play a leading role, namely, analytic (= language analytic) philosophy, practiced especially in Anglo-Saxon countries.

Bibl. s.: G.Nuchelmans, *Survey of Analytic Philosophy*, Utrecht/ Antwerp, 1969 (1. O.c., 18/23 (*Analysis of concepts*); 2. 23/30 (Analysis of judgments); 3. 30/37 (*Analysis of reasoning*)).

This is, therefore, still as it was at the time of the ancient Aristotle.

Explanation.
(1).-- Now reread, ETM 31 (morphe, forma, (creature) form) In traditional logic, the creature form is called "concept," "thought," "representation," because there it is treated purely as thought.
'Thoughtfulness' is called all that can be present as a form of being purely in our knowing and especially thinking mind.

(2).-- Now reread ETM arm 80 (encompass (imply)).

In traditional logic, one type of encompassing is central, namely, the fact that an original, as the subject of a sentence or of a sentence full stop, encompasses a model. A sentence e.g. clarified as follows such -- "I came home tired". -- I' is the original, about which information is communicated in 'came home tired'.

In other words : I, at that time, was in such a state that I implied “coming home tired. In other words: I, as I was then, cannot be thought of without the aspect of “coming home tired”. Thus “coming home tired” is a model (information) of me as an original.

Note.-- In passing, “coming home tired” was, at the time, inherently, ‘my own’, to me as I was to it at the time.

Explanation.

The hypothetical (= conditional) sentence is one type of encompassing and that is of encompassing of the subclause by the preposition. The prepositional phrase - FS - implies - logically at least - the postpositional phrase - AS -.

Applicable model.

“If soft rain falls, then the parched plants rebreathe.” -- In model-theoretic terms: “The fact of the falling soft rain (original) implies the fact of the rebreathing of the plants (model). For the rebreathing of desiccated plants provides information about the falling soft rain (as a cause of an effect e.g.).-- Or “The rebreathing of desiccated plants is inherent to falling soft rain”.

Note -- In our interpretation, causation is central to defining implication. One can also reason in the opposite direction: “The fact of the rebreathing of the parched plants implies - now in the sense of “presupposes” - gently falling rain. In this case, one starts from the consequence in order, from there, to think back to the presupposition (“hypothesis”) that makes that consequence “intelligible” (as a consequence of a cause).

Conclusion. - Like judgment, so is reasoning: it is relation between at least two forms of being - concepts or concepts articulated in judgments - and it is relation of the type “original (subject)/model (saying).”

Formal logic.

In Antique and Middle Ages language, ‘morphe’ (Lat.: forma), (creature) form, means “all that makes something distinct from the rest.” (ETM--harm 129), in that the overall (total identity) is itself and not something else.

Since the essence form - forma - is central to logic, it is therefore rightly called ‘formal logic’, i.e. logic of the forma or essence form. Insofar as that essence form is subject to implication(s).

Which, of course is something other than “formalized” logic (85 logical syntax).

The method of logic

Now reread ETM--harm 185 (compare) first.

Those who compare look for relations, which are as many "implications. In logic, logical implications are central: "if/ then" (if original, then model). The method of analyzing relations is the comparative method.

Bibl. s.: F.-J. Thonnard, A.A., Précis de philosophie (en harmonie avec les sciences), (Précis of philosophy (in harmony with the sciences), Paris, 1950, 653s..

Thonnard underlines the comparative method as a method concerning logical operations. - "La comparaison est la connaissance explicite de rapports" (The comparison is explicit knowledge of relations).-- Which, after all that went before, needs no further explanation.

1.-- The concept.

A clear insight into a concept is only possible insofar as - consciously, but very often unconsciously - comparison with the concept itself (internal comparison) - total identity - and with the rest of reality takes place. Especially that twofold division - complement - shows that comparison takes place.

2.a.-- The judgment.

Comparing - according to Thonnard - actively intervenes in a judgment. If one - which Thonnard does not do, but somewhere unconsciously presupposes (this is evident from the whole context) - sees the judgment as a subject (original) about which the saying (model) provides information, then the comparative nature is obvious.

2.b.-- The reasoning.

"L' inférence" (the reasoning, the derivation) - according to Thonnard - puts forward the comparison of at least two sentences.

"The concluding sentence or syllogism - says Thonnard - as reasoning - is an act by which the mind arrives at a third sentence thanks to the comparison of two prepositional sentences." (O.c., 58).

Appl. model.-- "Every spiritual (note: incorporeal, but still real) being is immortal. Well, the human soul is spiritual. Thus it is immortal". (Ibid.).

Comment by Thonnard: one compares "spiritual being" (of which the human soul is one type) with "immortal.

Says steller: "The principle that governs such acts of thought, in that type of reasoning, is (...): 'Two realities that are equal to one and the same third are also equal to one another'" (O.c., 60).

Cfr. ETM -- harm 140 where ánd Eukleides ánd Descartes are speaking.

The hypothetical sentence.

'Full sentence' is any sentence consisting of at least one sub sentence and one main sentence.

Thus, e.g., following transformation of previous syllogism, which was formulated in categorical (i.e., containing independent sentences) language: "if every spiritual being is immortal and the human soul is a spiritual being, then the human soul is immortal."

As Thonnard said: two realities - here: the universal collection of 'spiritual beings'("every spiritual being") and one private collection from it, i.e. human souls ("the human soul" is a synecdoche (ETM 24)) exhibit one and the same property, i.e. 'immortality'. Symbolically, A and B are C, where B is a subset of A.

Thonnerd, o.c., 59: "The syllogism (...) is that type of reasoning in which the mind agrees that, if it compares two states of affairs ('concepts objectifs') with a third state of affairs, they either go together or exclude each other."

"The syllogism that affirms the merging is affirmative; the syllogism that affirms the mutual exclusion is negative."

Deductive and reductive syllogism according to Jan Lukasiewicz (1878/1956)

Lukasiewicz is known among other things for his Aristotle's Syllogistic (1951)).-- Two schematic structures (ETM 39: schema).

1.-- Deductive scheme.

If A (prephrase), then B (postphrase). Well, A. So B.-- Or: "If A, then B and if A, then B" (hypothetical sentence, showing more clearly the derivation of the last sentence from the first two (prepositional phrases, 'premises')).

Semantic (ETM -- harm 98): "If our Mieke studies well, she certainly succeeds. Well, our Mieke studies well. So she certainly succeeds".

Hypothetical formulation: 'If our Mieke studies well, she succeeds and if she studies well, she succeeds'. The first 'if' is a mere presupposition apart from any testing (verification); the second 'if' is the introduction of a (merely assumed) verification of the first preposition.

2.-- Reductive scheme

If A, then B. Well, B. So A.-- Or : "If A, then B, and if B, then A".

Semantic translation of the logical syntax: "If our Mieke studies well, she succeeds. Well, she succeeds. So she studies well".

This is the formation of a hypothesis,--as one clearly sees, when thinking carefully.

Sample 27.-- Logic: theory of concepts (definition). (211/ 221)

Now reread ETM 28 (General Theory of Concepts), where we have already given the ontology of concepts (concepts, conceptions, representations).

Here we are concerned only with the logical theory of concepts.

Note.-- Very incidentally: one can also look at the concepts differently. Two methods.

1. P.J. Lindworsky,

S.J., Experimental Soul Science, Antw./ Br./ Gent/ Leuv., 1935, esp. from o.c., 265 (Understanding and meaning).

The Würzburg school, under O.Külpe (1862/1915), around 1900, with its psychology of thought and will, introduced the skilled introspective method--like Paul Diel, the psychologists of thought and will put the view into one's own soul life at the center, but this view is subjected to very strict autocritical rules of play--to analyze "simple acts of thought" e.g., according to their structure (ETM--harm 90;-- 117). Thus e.g. "a door, situated in its whole, e.g. the building" (which is a collective, metonymic structure).

From this then very new approach to spiritual life grew

a. The Cologne School, to which Father Lindworsky belonged,

b. The Mannheim School (Otto Selz et al,)

c. The Amsterdam School (Philip Kohnstamm).

The joint results show:

(a) there is first the 'layer' of singular representations (ETM 30;-- 190 (Schleiermacher)), proper first of all to the imagination, resp, the imaginary;

(b) than the 'layer' of faded - labeled as "schematic images" - representations, which already in its blurring drop the singular traits and generalize;

(c) the 'layer' of general and collective concepts, peculiar to the mind.

2. Hans Blumenberg,

Die Lesbarkeit der Welt, Frankf.a.M., 1981.-- This is, -- in German: 'Begriffsgeschichte' (history of concepts). The world -- the being -- is seen as a book to be read (metaphorically-poetically). In it, images, metaphors and also concepts (resp. concept schemata) circulate, which are subjected to a historical examination.

Class logistics.

Bibl. s.: W.V.O. Quine, Logique élémentaire, Paris, 1972.

(A) When we claim that "the people" are numerous, we do not mean to say that every person or some people are "numerous.

What has "numerous" as its key attribute is a well-defined abstract fact, the class of people.

When we say that man is a species of animal, we mean by that that abstract entity, the class of people, is a species of animal.

When we claim that the Apostles are “in number of twelve” - “a dozen” - we are thereby claiming - again - that an abstract fact, the class of Apostles, represents “a dozen”; for no Apostle, taken individually, is “a dozen!

(B) On the contrary, each apostle individually “belongs” to this abstract entity, the class of apostles.

Also each individual person “belongs” to the class of people.

The meaningful (‘symbolic’) expression for this is “x e y”(= “x belongs to y”).

So e.g., “Peter ‘e’ (belongs to) the class of Apostles” and also “Peter ‘e’ belongs to the class of men.”

Note.-- It is seen that what is called ‘set theory’ is that mathematics which is concerned with expressions such as “class” or “belong/ belongs to”.

Note.-- Doede Nauta, *Logic and Model*, Bussum, 1970, 65, notes that -- for theory-critical reasons -- one sometimes makes a distinction between ‘collection’ and ‘class’.

Note.-- The opposition pair “connotation (intension)/ denotation (extension).”

What we, in, Antique-Scholastic tradition called ‘comprehension content’ (= ‘comprehension’), is also called ‘connotation’ (= ‘intensity’) - do not confuse with ‘intention’ (a. intention, b. orientation of our consciousness’). What we called ‘comprehension extent’ is then called ‘denotation’ (= ‘extension’, the Scholastics already called the extent ‘extensio’).

For example, John Stuart Mill (1806/1873; *System of Logic* (1843)), I: 2, 5: “The word ‘white’ denotes ‘all white things’ - as snow, paper, the foam of the sea, etc. - and implies - or as it was termed by the schoolmen - connotes the attribute ‘whiteness’ “. (The word ‘white’ includes all white data -- such as snow, paper, the foam of the sea, etc.-- and implies -- or as it was termed by the Scholasticians -- connotes the attribute ‘whiteness’).

Note.-- The Cartesian G.W. Leibniz (1646/1716), in his *Meditationes de cognitione, veritate et ideis* (Reflections on Knowledge, Truth and Concepts) (1648) labels a concept:

(i) as ‘clear’, when it makes known in our minds all the objects intended by it (the elements it ‘collects’) ready (clear to extent),

(ii) as clear, when it brings the content of knowledge and thought (the common properties of the elements) clearly to mind, (clear in content).

Note.-- Already the Antiques (in part) and the Scholastics distinguished following aspects of the idea:

a.1. 'conceptus', concept, as a summary ('collection') of elements;

a.2. 'notio', notion, as a common property, proper to a set of elements;

b. 'horos', terminus, term, as expressed in a language. Cfr. O.Willmann, *Abriss der Philosophie*, Wien, 1959-5, 52/72.

Inverse proportionality "content/size".

"The content of a concept is, necessarily, inversely proportional to its scope." (Ch. Lahr, *Logique*, 493).

Appl. model.-- TF 1 (the French privatized TV), Orangina, as sponsors of showbiz, launched -- after making the lambada infamous in 1989 -- the "Soca" in 1990, "SO" as a shortening of "SOUL" and "CA" as a shortening of "calypso. Each of these terms has its own content (notio) and scope (conceptus). But in the case of 'soca' the content, the notional aspect, is much richer than in the cases of 'soul' and 'calypso'. Consequence: the scope (the conceptual aspect) is much poorer.

Appl. model.

Similarly, the content of "actress" is much richer than that of "woman" - an actress is a woman who is an actress - but the scope - the number of women to whom the content "strikes" (is appropriate) - is much poorer (her number is much less).

Appl. model.

So too with the logistic or mathematical signs ('symbols'): 2, a, x (2 is an instance of a, a is one instance of x). At least in the artificial languages that systematically manipulate its symbols.

But by content, x is "poorer" than a and a is "poorer" than 2.

Abbreviation symbols.

Bibl. s.: W. Kaulbach, *Philosophische Grundlegung zu einer wissenschaftlichen Symbolik*, (Philosophical foundation for a scientific symbolism), Meisenheim/ Glan, 1954.

The author emphasizes the thorough scope distinction between the signs (ETM--harm 98) of:

(1) the traditional logic (abbreviation symbols) and

(2) the more recent logistic-mathematical languages.

Note -- We disagree.

(1) Either 2, a, x stand for themselves (and then they are signs-without, syntactically). Either they refer to realities indicated by them (or designatable), semantically. -- Cfr ETM--harm 81; 84; 98.

Saying as Kaulbach - and in his wake G. Jacoby - that:

(1) the traditional-logical characters are merely abbreviations of the "natural" language and

(2) the recent-logic characters are "merely meaningless language characters," has forgotten that:

(1) the abbreviation characters of traditional logic are on their way to being purely syntactic characters, susceptible to "editing," and

(2) that the signs of actual logistics are either, syntactically, parts of very rigid logical 'operations' or, semantically, refer to realities that can be indicated by them,-- just like the abbreviations of traditional logic.

Conclusion: the so-called 'contentless' signs of a mere calculus (= syntax, 'account') are only 'contentless' as long as they are not processed by 'logical syntax', as soon as they are semantically signified, they are likewise no longer 'contentless'.

The opposition pair of "definition/classification".

Ch. Lahr, *Logique*, 499, says it abundantly: one sees the analogy between definition (essence determination) and classification (a.o. typology), better: enumeration (ETM 39: summative induction includes, in its first stage 'enumeration').

Says we, in turn, ready:

a. Definition is the articulation, preferably as brief as possible, of the content of a concept;

b. Enumeration - possibly in the summarizing form of classification and/or typology - is the shortest possible articulation of the scope of a concept.

Definition doctrine.

To properly understand the essence of defining, one must start from Leibniz's pairing "clear extent/ clear content."

The method here we already saw - ETM-harm 190 - : Descartes wanted, at all costs, to get out of the confused-orderly thinking - of the late Scholastics (it founded skepticism everywhere). To this end he designed, as a Rationalist of the first hour, his 'method' of:

a. first analyze, i.e., reduce to the irreducible elements (terminated with summative induction as a check);

b. then synthesize, i.e., look up the relations (summarized in "structure" (ETM--harm 90; 121, 123, 193)).

Leibniz did, basically the same thing:

a. Clear scope (irreducible elements);

b. Clear content (relationships, structure).

Note: definiteness is at the same time, laterally, enumeration theory. Content involves scope and scope involves content.-- One remembers that well.

Definition of "definition".

Ch. Lahr, *Logique*, 620, says: a definition is the formulation ('pronouncing') of the content of a conception and it is in the form of a reciprocal statement (ETM-harm 78 (symmetric relation)) - see also ETM - harm 81: bi-implication -.

In this sense, a definition is something tautological: i.e. one says in the subject basically the very same thing (in ancient Greek 'tauton') as in the saying. By what/why? Because in the proverb an exact model of the subject, the original, is expressed. In other words, the same content of knowledge and thought is expressed (i) first as the subject, (ii) then as the proverb - but in different terms.

Two characteristics.

(1) Exclusive

A successful definition reflects only (exclusively, exclusively) the thing to be defined.-- In the language of the Latin-speaking Scholastics: the solo definito (the defined alone is spoken of).

(2) Totally.

The successful definition represents the thing to be defined in its totality - all elements, all parts either of the set or of the system.-

Scholastic: de omni (et toto) definito (all (and wholly) defined realities are spoken of).-- Latin, in summary: "de omni (toto) et solo. definito".

Literatological description.

Among the text types in literature are the description, the narrative, the treatise (dissertation) and its highly abbreviated form the report (rapport), as we see in rhetoric.

Well, a good definition can be seen as a description/story/discourse or its abbreviated form, the report, in an extremely abbreviated form, however, such that the essence form (ETM 31; also existence + essence (ETM 33v.)), i.e. that by which something (the defined here) differs from the rest, of the thing to be defined is correctly and fully represented.

Conclusion: solid definitions, which "have something", are résumés of longer texts.

Scientific Description.

Ch. Lahr, *Logique*, 4985., distinguishes between two types of definition.

a. The provisional, usually partial definition, which reflects at least one essence.

b. The finished, sometimes final and complete definition, which in a few words captures just about all the features of being (as far as our fail-safe knowledge will allow).

Indeed: one can sometimes ‘define’ something with just one trait, so that everyone knows exactly what it is about (the solo et omni, resp. toto definito).

Appl. model.

In everyday language one hears, at a school, say, “The ‘beard’ is there” (the principal has a distinctive beard and is therefore, metonymically, called “the beard”). One does not, in everyday language, need more.

In an analogous way, scientific research sometimes begins with just one feature of the object of research. But more than enough to start serious scientific research.

In Platonic language: a lemmatic definition. ‘Lèmma’ means “provisional understanding”.

Final sum:

One can define scientific labor as the effort, which is made to get from a preliminary to a finished definition. Science is one long work of definition.

What did people know a good century ago about the interior of the atom, e.g.? Very little. However, thanks to analysis - in Platonism also the term for ‘dissection work’, investigative work -, one moves from a lemmatic definition to an ‘analytic’ (finished) definition.-- In Platonism this is called the “lemmatic-analytic method”.

Note.-In the language of Alfred Fouillée (1838/1912; *La psychologie des idées-forces* (the psychology of power ideas), (1893)), the ‘effect’ of a lemma is activating,--hence the term he created ‘idée-force’ (power thought). As in everyday life, so in science work: we are ‘stimulated’, ‘activated’, ‘driven’, by e.g. one concept.

Appl. model.

Sören Kierkegaard (1813/1855; father of Existentialism) said at the time that one only begins to “exist” (= to “exist” as a human being in this world), when one begins to live for one thought.

Thus, many true researchers are “existentially” involved (“committed”) in their work, “driven” by one or a few conceptions, which they test -- inductively usually -- against the facts. Thus they succeed in finding a true definition,---sometimes after years.

Decision.

(1) Preliminary definitions are often easy to articulate.

(2) Finished definitions, however, may never be attainable, given the inductive, sampling nature of our knowing.

Cfr. ETM 04 (Paleopythagoric fallibilism).

Ontological description.

One knows, in ancient Greek, the terms "genos" (L.: "genus"), "genus" (understand: universal collection) and "eidos" (L.: "species"), "species" (understand: private collection).

Well, the 'eidopoios diafora' (L.: 'differentia specifica'), 'species or specific difference, is the preferred means of defining something in provisional - 'nominal' or 'wordy' - definitions.

Appl. model.

"Man is a being gifted with spirit.

Clearly, the one who defines:

(1) begins with a dichotomy (ETM--harm 129) between universal(er) collection and less universal collection,

(2) takes the (more) universal collections as the 'background' and expresses the species difference against that background.

Here: man is **(1)** a being (even ontologically universal), **(2)** which stands out against the rest thanks to 'spirit'. 'Spirit' here is the species difference.

It is safe to say that this is the basic form - unconsciously most of the time - of all definitional work. If thou must define something, find a dichotomy of that nature.

Abbreviated typology of definitions.

Do we now take some practical samples.

1.-- Bibl. s.: Evelyne Farache, *Corée du Sud: Sur les chemins des temples bouddhistes*, (South Korea: On the paths of the Buddhist temples), in: Journal de Genève 28. 09.1990.

The writer seeks to provide the reader(s) with an abbreviated definition of a central figure--now in South Korea--the shaman (ETM--HARM 137) -- See how she proceeds.

(a) "Do we not forget to mention Confucianism which represents the official teachings of the South Korean state. And do we also mention Shamanism, an ancient religion originating in Central Asia, -- a religion that is present in all activities of daily life."

(b) "The Buddhist monk, through meditation types, seeks to acquire all kinds of a 'clear' or enlightened mind to gain some insight into the real nature of the world.

The Shaman, however, appeals to deities in such a way that they improve the practical situation of the people who are embroiled in earthly situations."

Note.-- It is clear that the systechie (ETM--harm 125) "meditation/ fate enhancement" here serves to give a preliminary definition of two types of religion. Contrast is, indeed, one way of defining.

2.-- Bibl. s.: Ph. Davis/ R. Hersh, *L 'univers mathématique*, (The mathematical universe,), Paris, Bordas, 1985 (// The Mathematical Experience, Boston, 1982), 6/8 (qu'est-ce que les mathématiques?).

(a)1. A 'naïve' - understand: situated before any thorough mathematical education - definition, suitable for the ordinary dictionary and providing an initial understanding, reads, "Mathematics is the science of how great ('quantity') and of space" (o.c.,6).

Which corresponds to number and space mathematics.

(a)2. One can slightly broaden this definition and add: "Mathematics deals with quantity and space as well as the symbolism, - understand: the system of signs, with which mathematics works - that connects quantity and space." (Ibid.).

By incorporating the system of symbols, one broadens the content, but narrows the scope. After all, a non-symbolic treatment of quantity and space is precisely why it is not yet true mathematics.

"This definition - argues the proposers - surely has a historical basis. It will be our starting point". (Ibid.).

***Note.* –** Do you see the lemmatic-analytical method introduced by Platon at work? The lemma or provisional insight is a concept of power (Fouillée), which guides the "analysis" (here for "research").

(2) Saying proposers, "But one of the intentions of this book is to modify and broaden that definition so that it:

(1) the development of mathematics over the last few centuries and

(2) reflects the interpretations of the various mathematical orientations (schools) of what mathematics ought to be."

Note.-- With this, theorists are clearly saying that science begins with vague but characteristic traits of its object. Platonic: with a lemma.

Note.-- Note that what is called "stipulative definition" is not quite the same thing.

One gives an already established term -- (a) arbitrarily, (b) but for reason of understanding (i.e., to make the conversation flow smoothly) -- a new and provisional meaning,-- that is, stipulative definition.

3.-- Bibl. st.: Suren Erkman, Biotechnologies: la vie, matière à brevets, in: Journal de Genève 09. 06. 1990. Following a symposium on le Brevet du Vivant (Lausanne), the author writes what follows.

The chemical industry demands it: what defines life par excellence - the ability to reproduce - could, in a near future, become 'brevetable' ('brevetable', patentable, subject of patent).

1. To patent "life"?

(1) Around 1900 such a question still seemed incongruous. Because since ancient times one distinguished - like water and fire - living beings from the lifeless products of human ability. Only such inanimate products could enjoy the legal protection of a patent.

(2) The present progress in genetics eliminates the above distinction. After all, the techniques of molecular biology make it possible to manufacture living matter (note: note the correct term: "the matter containing life," - not life itself) almost at will.

2. Traditionally...

Traditionally, an inventor has to give a description of both his method of inventing and his product when applying for a patent. This description must be so precise that a specialist in the field can duplicate the invention.

Well, the description of, for example, an engineered bacterium or a new gene introduced into a mouse, is not feasible given its enormous complexity.

Note.-- It is evident that the so-called "description" is actually a "definition" such that it makes the thing to be brevetted distinct from the rest.

As an aside, a "gene" is that which comprises the hereditary properties in a cell nucleus.

4.-- Bibl. s.: *Communication.-- L'image lingerie*, in: Lingerie (Paris), 8 (1990: Nov.-déc.), 62/64.

What the Ancient Greeks called "rhetoric" is now called, in part, marketing, salesmanship (publicity).

With respect to lingerie, two "definitions" exist. We describe them briefly by reference to the article.

(A).-- "The product and only the product".

On the one hand, all that advocates a strategy (op.: method of marketing),--with the motto "The product and only the product."

Among them "greats" like Chantelle or Triumph. Experts have their reasons.

1. For example, the agency Eldorado that runs the publicity campaign for Chantelle: "If one makes the communication (with the public) revolve around the product itself in such a way that one invariably avoids diverting attention from it, then one can "circumvent the problem of vulgarity (degradation),--problem that arises with clockwork regularity, whenever one exposes a woman in her underwear."

2. So did the agency MDC, which is designing the campaign for Triumph. There, it is deemed necessary to undo the trap that consists in making a woman a gorgeous mannequin.

(B) "Star strategy" (star campaign).

On the other hand, all that "star strategy" unconditionally prioritizes.-- In their view, the image impression -- image -- created by a well-known star, wearing the brand's colors, is irreplaceable.

For example, the marketing director of the Vitos brand, in France, chose Ornella Muti.

Note -- In front of a radiant photo of Ornella Muti, the famous film actress, the text says: "All studies confirm it: the image impression emanating from Ornella Muti comes across very positively to the public, -- both to the women who admire in her a devoted stay-at-home mother, and to the men who idolize her for her beauty-femininity."

Conclusion

A couple of phrases - "The product and only the product" and "star strategy" - define the hypothesis (ETM 02) of the rhetoric by which a piece of underwear is brought to the "woman" (especially).

The justification of the first publicity definition takes us into the sphere of "the sacred", which is "degraded" - desecrated, desacralized - in a well-defined representation of women (ETM 59). It is, in passing, undeniable that some of the publicity compromises the sacredness of in-laws, several times not without cynicism. Which some marketing leaders want to avoid at all costs, apparently.

A tome.

"The man for all women and the woman for all men."

While we are now in the sphere of human beauty, here is what Rob Betlem, *Men and cosmetics*, in: Esthéticienne (Amsterdam), 21.12.1989, 41, writes about ...Julius Caesar (-101/- 44; commander of the army and writer): "It is known that Julius Caesar had an enormous aura that appealed especially erotically in a strong way to both men and women. Contemporaries called him 'the man for all women and the woman for all men'. (...)".

Note.-- It must be admitted: the 'definition' given by those contemporaries is apt. One sees that one can 'define' in many ways, i.e. give a shorter or longer description of the form of being.

5.-- Bibl. s.: Beauty.-- Do Not Disturb, in: *Cosmopolitan* 1990: Feb., 91/92.

Already the title of the little article "typifies," i.e., characterizes or "defines. -- Listen: "It's cold and bleak outside. And 'cocooning' is the new trend (note: stretching): a. nice and relaxed in front of the fireplace, b. comfortable clothes, c. a drink ... The time to pamper yourself (...)".

In English, "cocoon" (noun) is:
a. a cocoon or chrysalis (of a butterfly, for example),
b. a cover or protective sheath.

And 'to cocoon' means a. to form a cocoon, to pupate, b. to envelop. And a 'cocoonery' is a silk worm breeding place.

But, since some time, the term appears as a cultural trait: today's man wants to live in a "cocoon" or "cover" somewhere, -- at least after his working days.

This culturological significance is also found outside fashion and women's magazines, of course, although it is often true that fashion and women's worlds are very sensitive to new cultural phenomena.-- In our cynical-cold world of today, people often look for a counterweight--a counter model--to regain balance (ETM--harm 173). Now to express this in the language of dynamic systems.

6.-- Bibl. s: Ch. Lahr, *Logique*, 48, 498, on "soul".

Although not all features of the thing to be defined are indicated, the requirement "de solo et omni vel toto definito" (ETM--LOG 215) can be considered satisfied.

Appl. mod.-- The human soul can be defined as "the principle of conscious life".

A psychoanalyst, Freudian or not, will point out that this definition skips a very important aspect of the soul's life, namely the unconscious and subconscious. To which others - especially orientalizers (ETM 41: Postmodernists) - then add the superconscious.

Lahr says: I mean by this, with the given definition, to give nothing more than a partial and therefore provisional characterization,-- inclusive (including), not exclusive (excluding).

In Cartesian philosophy, e.g., the definition "soul is seat of conscious life" is certainly valid. This, -- due to Descartes one-sided emphasis on consciousness (man is a kind of angel in a machine (in the body)). Cfr ETM--LOG 215 (lemmatic definition).

Compare with the definition of "human" (ETM--LOG 217) in terms of ontological description (gender: principle; species: of consciousness).

Sample 28.-- Logic: theory of concepts (Platonism). (222/ 227)

There are enormous misunderstandings concerning Platon's doctrine of the 'idea', -- After all, people invariably discuss the Platonic doctrine of ideas within the framework of some doctrine of concepts. Where - in the strict sense - it does not belong.

Says E. De Strycker, S.J., *Concise History of Ancient Philosophy,* Antwerp, 1967, 95, n. 39: "The terms 'eidos', 'idea'.

Note.-- the two words for Platonic 'idea' -- denote an objective structure, -- not a representation in our minds".

This structure is "perfect what it is"; -- it is, at once, the ideal type of its 'images' in the concrete world.

Appl. model.

Supposedly: a craftsman wants to produce a 'good' (valuable) work. For example, he wants to make a 'good' cabinet.

(1) He possesses, from the observations of concrete, existing closets a conception of his own "closet. This we call, now, "the general concept," in his mind.

(2) Platonically it is not so simple. The craftsman should, in fact, first know from the mind of the universe founder, 'demiourgos', the idea 'closet'; it should "float before his mind".

(3) Then he would see, by means of comparison (ETM--HARM 153), that his poor little concept itself is but one possible applicative model of the universal idea, in the mind of the universe-founding deity.

As De Strycker, ibid., rightly says; in the course of the XVIth century people confused the notions of 'understanding' (logical) and (Platonic) 'idea'. Thus, in French, the term 'idée' - e.g., with Ch. Lahr, in his *Logique* - is the same as 'concept'

Note.-- Hence the enormous confusion of concepts attached to the term "idealism.

(1) Is called "idealism" first of all all that which places the concepts at the center. Thus in Cartesianism.

(2) Called, likewise, 'idealism' something like the doctrine of ideas of Platonism.-- But it is evident, after what we have just said, that with this two thoroughly different data are - in a superficial way - 'assimilated' (ETM--HARM 195 (assimilism)).

Conclusion. - Once and for all we denote the doctrine concerning ideas in Platon by the exclusive term "doctrine of ideas" (and not by the term "idealism" which is too ambiguous).

Briefly: **(1)** ideas are found in the cosmos ordered by a deity;

(2) The concepts in our human minds.

The Platonic theory concerning understanding.

Bibl. s.:

-- Platon, *Der siebente Brief (An die Verwandten und Freunde des Dion zu Syrakus)*, (The seventh letter (To the relatives and friends of Dion at Syracuse)), Calw, 1948, 36ff.;

-- V. Goldschmidt, *Les dialogues de Platon (Structure et méthode dialectique)*, (Plato's dialogues (Structure and dialectical method)), Paris, 1947, 3ss..

Here is what Platon, in the seventh letter (which is gradually being interpreted more and more as real), says concerning the concept. "For every fact there are three methods which allow one to gain a scientific understanding of it.

That "scientific understanding" itself is a fourth approach.

Fifth, one must situate the object itself: that object (i) really exists and (ii) it is knowable."

The first three "methods" are:

a. the name;

b. definition;

c. the phenomenon, in which the concept (and even the idea) finds a 'representation' ('picture'). These three together Platon called "science in the ordinary sense.

But, in his view, that type of "science" is merely a fallible insight (ETM 04: fallibilism), which, while valuable, to some extent (criticism of science, criticism of ideology), must ultimately be confronted with the divine conception that in the phenomena of the cosmos and in those of our knowing and feeling as a general premise - "hypothesis," (ETM 02) then is the work.

Only if one possesses that "mystical" insight -- thanks to a certain identification with the universe-founding deity -- can one speak of real, -- in Platon's parlance "good" (valuable) science.

Conclusion.-- What is called 'science' on average is, in Platon's eyes, at most a hypothesis to be tested. Platonic ideocentrism (the fact that he puts ideas at the center) is, fundamentally, theological ideocentrism.

Note.-- The proposition that the ideas are the ideas of God does not go back to Platon (he knows only the universe order founder or "demiürg"), but dates to Albinos of Smurna (Albinus of Smyrna; known for his *Didaskalikos*, a systematic survey of Platon's teachings (around +150)).

As may be known: the Christian thinkers, who thought strongly Platonizing for the first eight centuries, situated Platonic ideas in the Godhead of the Bible.

Which, of course, is a profound re-founding of the doctrine of ideas, in that the Biblical concept of God presupposes a radically transcendent (transcending all createdness) divine reality.

Explanation. -- Let us dwell for a moment on the Platonic theory of understanding.

A.-- "Name, definition. case (= phenomenon. 'image')".

Ch. Lahr would speak of "from the nominal (name-bound) to the business ('real') definition."

B.-- Appl. model.

The 'kuklos' (circle, - circle,-- 'circulus' (L.), circle).

1. The name

'Circle', for example, is something that bears the very name that we have just pronounced.

Note.-- The Nominalists, who always stick to the names ('nomina' (L.), names) -- as e.g. a number of Platon's contemporaries, including the Protosophists (-450/-350), whom he so combated because they -- besides the names ('terms', -- hence the term 'terminism') -- thought only of the multiplicity of interpretations of those names,-- too little or not even of the things themselves) -- invariably began with the name.

So too is Platon. Why? Because the name, part of the system of language, is a first - lemmatic-analytical (ETM-- LOG 216,-- 221) - approach to the matter (phenomenon) itself. Whoever knows what in a language area everybody understands by the 'name' 'circle', already knows something serious about both the use of language and perhaps about the circle itself (to the extent that the use of language in this matter is objectively valid).

2. The definition

"The second thing that concerns the circle is the definition articulated in our language. This consists of nouns - subjects, originals (nominal component) - and verbs - sayings, models (verbal component).

In this case, "all that in its extremes is everywhere equally distant from the center.

"Something like that - Platon himself said - might well be the definition of that fact which is meant by the name 'round', 'circle', 'circle'."

Note. Do you sense in these words Platon's scepticism (doubtfulness) about the current definitions, -- even those of the mathematics of his time which he held in very high esteem? Only the universe-orderer himself who has thought of all possible rounds and circles and circles, thanks to the pre-existing, 'eternal' ideas also for him, can give a definitive definition -- the 'good' definition.

3. The material image

"The third point is the material image (representation in matter) of the circle. Our physical senses perceive such things. A draftsman, a turner depict them. In contrast to the eternal idea 'circle', the circle drawn by the draughtsman in the sand or on a plane or depicted by the turner in clay is erasable, destructible, - impermanent.

As the Ancient Greeks said, such circles exhibit ‘genesis’, arising, and ‘phthora’, perishing, (ETM--HARM 160: turning to the contrary’).

Not so the idea, the ‘paradeigma’, the paragon, the archetype (‘archetupos’), which comes through in the visible and tangible phenomena for a moment,--in a transient way. “The circle in itself,” as Platon still says (i.e. the eternal idea ‘circle’), is imperishable. Thus -- as imperishable -- it stands for our spirit.

Summary.
(1) The name represents a concept.
(2)a The content of that term is clarified in the definition.
(2)b The extent of that concept becomes apparent in the case -- the phenomenon, the ‘picture’ (as Platon likes to say,-- i.e. the applicative model). But this is the inductive method: one takes one or more samples in the scope of the concept in order to make concrete, on the basis of one or more specimens, the content of the concept.

In education this inductive method is called “visual education”: one shows one or more examples to the children, who thus come to an “understanding” of the content of a concept. In other words: the examples make the ‘rule’ (the general understanding) clear.

What we have already learned ETM--HARM 128: without definition, the thing meant by it is “blind” (opaque); without a thing, the definition of that thing is “empty. -- Behold the core of the Platonic doctrine of understanding.

Platonic epistemology.
Cfr ETM 32.-- “Scientific knowledge” is the result of its three preceding aspects. Our mind possesses an objectively (realistically) true representation (understanding) of a given. A round disc in clay, a circle depicted in sand become transparent to our mind (intellect/ reason).

Platonic Noölogy.
That (scientific) knowledge is situated in our mind. In Greek ‘nous’ (L.: intellectus); hence ‘noölogie’ (theory concerning the mind).-- This is an aspect of the soul .

The soul, as with the Paleopythagoreans, is main, with Platon.

As an aside, for Aristotle the human soul is mortal,--for his teacher Platon it is immortal (Aristotle secularizes (ETM 64), Platon does not).

Pre-existence (pre-existence), yes, reincarnation (re-embodiment belief) concerning the soul.

1. "Before the soul enters a body, it has journeyed - in the wake of the deities - along the celestial axis and beheld "the upper heavenly places."

a. The deities enjoy, there, the sight of ideas.

b. Human souls (...) succeed in this only partially". (G.J. De Vries, Plato's image of man, in: Tijdschr. v. Philosophie 15 (1953): 3, 433).

A little further, the author says, "Something must have seen the souls of the ideas, for the soul that has never seen the truth will never come into this form (the human body)." (Ibid.).

2. E.W. Beth, *De wijsbegeerte der wiskunde van Parmenides tot Bolzano*, Antw./ Nijmegen., 1944, 29, says that Platon, in his dialogue Menon, exists a method - among others - to make mathematical knowledge conscious, namely the 'anamnèsis', the memory. To teach a slave mathematics amounts to bringing to full consciousness what he has 'witnessed' in terms of mathematical ideas before incarnating in the body.

Which brings to mind the maieutic method of Socrates, who interpreted the learning process as the transfer to consciousness of what is already present in the unconscious layers of the soul. One kind of depth psychology, in other words.

Conclusion

a. Through the senses the soul contacts the 'phenomena' (the 'matter'). In those phenomena the 'pictures' of the ideas are present. Thus our mind - nous, intellectus - comes to some understanding of the idea that comes through in a phenomenon. Thus a flower is a singular and, moreover, defective copy of its idea.

b. Yet at the same time - in the pre-existence hypothesis (that's all it is to Platon as a philosopher who transcends myth) - the soul remembers that it once, before its birth shock in the body, beheld that idea 'flower'. Immediately that memory becomes of unconscious conscious. This, thanks to the maieutic method of Socrates (who distinguishes this method active for the pupil from the 'didactic method', where the teacher, as it were authoritarian or from above, communicates information).

Anagogy.

Anagogia" is to lead to the higher, to look up to all that is higher and exalted. This is also called 'light metaphysics': the (higher) ideas are the light that illuminates us in life.

'Theoria'.

Bibl. s.: O. Willmann, *Die wichtigsten philosophischen Fachausdrücke in historischer Anordnung*, (The most important philosophical terms in historical order,), Kempten/ Munich, 1909, 20f.-.

1.-- 'Theoria'

'Theoria' is invariable:

(a) through the visible (of immediate experiences)

(b) to penetrate the invisible,-- to see through the visible or phenomenal, to understand it, from the invisible that goes with it.

'Theoria', then, is anything but 'floaty' knowing or worldliness,

2.a.-- The Paleopythagoreans.

It is reported that Pythagoras is the philosopher, the wisdom seeker, a 'theates', a reflective one. Thus, a person may come to the Olympic Games (founded in -776) to 'perform' ('gain fame') or for profit. The philosophos, however, comes to 'watch':

(a) he lives through the viewing game as a mere spectator;

(b) to come to an understanding of the true structure of what he, with his senses, sees.

In short: to watch, to observe, attuned to transparency. That's Paleopythagorean "theoria.

2.b.-- Platon.

Platon defines 'science' in the above sense "theorètikè tou ontos", literally: theory concerning all that is.

(a) One observes,-- inductively sampling in total reality.

(b) One tries, at the same time, to gain insight into the structure of the observed, - which leads to the name, - definition (content) and case (scope) of the corresponding concept. To what we now call: 'theory'.

In which, for Platon, in the background, something esoteric-mystical always emerges, namely the insight into the idea, which comes through the understanding and through the phenomenon. Reflective 'contemplation'.

3.a.-- The Romans.

In Latin at Rome, 'theoria' was translated by 'speculatio', contemplation, 'speculation'. -- 'Specula' means 'watchtower' (watchtower), from which one has a perspective (viewpoint) over a body of data,-- also point of view, viewpoint.

3.b.-- The Scholastic (800/1450).

One distinguished, in the Middle Ages,

(i) speculatio, contemplation,--which leads to theory, of

(ii) 'contemplatio', mystical-paranormal 'beholding', -- also: clairvoyant insight, paranormal see-through.

What was present e.g. in the ancient mystery religions, with its 'theoria', mystical contemplation of the 'mysteries' (cult objects). And in the Eastern liturgies.

Returning to the thread ETM--LOG 213 (content/scope) taught us the two aspects of the concept. ETM--LOG 214 taught us the pair "definition/ enumeration (classification)".-- Now turn to the scope definition, if we may so express it.

Taxinomy / taxonomy.

1. Taxinomy is classificatory (theoretical).

2. Taxonomy is applied taxinomy, i.e. all that is classification system. Thus e.g. the taxonomy of biologists, who classify plants and animals.

G. de Landsheer, *Introduction to Educational Research*, Rotterdam/ Antwerp, 1973, 15, speaks of "an integrated set of precise definitions, easily manageable." Thus, in terms of scope, our mind establishes order.

Enumeration/classification (typology).

Classification is one type of enumeration.

Immediately we fall back on summative induction as a premise (ETM 39): "from any element and/or part of a set and/or system (ETM--HARM 90) to all collectively." This, on the basis of common properties.

A.-- The enumeration

The enumeration of all singular elements is the detailed form. Immediately the extent of a concept becomes "clear" (Leibniz (ETM--LOG 212)) and the concept is no longer "empty" (ETM--HARM 128).

B.-- The classification

Classification (typology) is the enumeration in the form of groups, sets, of elements,-- sets that are subsets and summaries. Less detailed. 'Typology' is enumeration in the form of types (kinds).

Classification (typology).

Generally speaking, to 'divide' is to divide a totality (collection and/or system) into elements and/or parts.- Lahr, *Logique*, 499 (La division), specifies.

a.-- A collection

Scholastic 'omne' (ETM--HARM 91; distributive structure; metaphorical) - becomes clear, non-empty, through the enumeration or classification into types (types) of the elements.

b.-- A system

Scholastic 'totum' (ETM--HARM 92; collective str.; metonymic) - becomes clear, non-empty, through the enumeration or classification into types (sorts) of the elements, which are parts in a system.

See also Platon matter ETM--HARM 97 (all and whole). Here again it is clear how fundamental order theory is.

The two main traits of a successful enumeration/classification.

Ch. Lahr, *Logique*, 500, puts forward two requirements.

1.-- All elements /parts, resp. types (types).

An enumeration/classification is complete (‘adequate’ i.e. representing the whole scope) if it does not omit any element/part or group (species). Otherwise the induction is not summative (representing the sum or totality).

2.-- All right once.

Irreducible is an enumeration/classification if it does not list all elements/parts and types (types) more than once. If not, there is redundancy (redundancy).

A first example is the set of axiomata (propositions) that the axiomatic-deductive method proposes. The initial propositions must be irreducible and complete. - See ETM--HARM 159 (dialectics).

Listing/ classifying well is a testament to spirit.

None other than the famous cultural anthropologist (ethnologist) Claude Lévi-Strauss (1908/2009); Anthropologie structurale, Paris, Plon, 1958) writes in his *La pensée sauvage*, (The wild thought), 1962, 24, what follows.

1. As an aside, M. Frank, *Qu’est-ce que le néo-structuralisme*, (What is neo-structuralism), Paris, Cerf, classifies Structuralism (ETM--HARM 99) as follows:

a. the first, “straightforward” structuralists are F. de Saussure and Cl. Lévi-Strauss;

b. the Neo-Structuralists are J. Derrida, M. Foucault, J.Lacan, G. Deleuze. Structuralism which peaked around 1968 is now in decline.

2. Cl. Lévi-Strauss spent years analyzing the thinking and logic of the “sauvages” (the name first given to the “natural peoples” or “primitives” by Enlightenment-Rational Europe). It became clear to him that they too were already working logically, but with partially different assumptions.

See here what he writes about grading:

“**(1**) Already (among a number of things) picking out the cleanest involves classification. Any classification (‘classification’) is better than disorder.

(2) And even a classification supported on sensory properties is a milestone on the road to a reasoned ordering.

Supposedly, one asks for a bunch of fruits, to be classified (“classer”) under consideration of weight. It will be justifiable to start with the peeling of the pears and the apples. Not because the shape, color and taste have anything to do with weight and size.

But rather because the largest among the apples is more easily distinguished from the smaller ones than if the apples remained mixed with fruits of a different type.

Thanks to this example already one sees that -- even on the level of aesthetic perception (note: the greatest are the cleanest; hence the term 'aesthetic' (ETM-HARM 149))-- classification proves its soundness."

The taxinomic method in Platon.

Especially in his dialogues *Faidros, Sophistes, Politikos*, Platon talks about the interrelatedness--typically of the dialectic (ETM--HARM 158)--of concepts.

The method is twofold.

a. -- *The diairetic (dietary) method*.

'Diairesis' means 'classification'. When Platon draws up definitions, he applies that method.

As an aside: of this we saw, ETM--LOG 217, an example (ontological description), in which the antithesis pair "genus (universal collection)/ species (private collection) plays the main role.

One starts from the more general to the less general.

b.-- *The synoptic method.*

'Sunopsis' is "to see more than one data together". This is the reversal of the diairetic method: one starts from the less general.

Notes. - ***Bibl. s.:*** W. Klever, *Dialectical Thinking*, Bussum, 1981, 51/54 (Parmenides and Sophistes).

The dialogues *Parmenides and Sophistes* are more mature dialogues. In both, Platon opposes: "the static juxtaposition" of concepts.

"In the greatest embarrassment one gets by the requirement that the concepts exist separated from each other (Parm. 133b). They are related to each other. Thus, for example, 'slavery' and 'dominion' involve each other" (Parm. 133d/e).

Cfr. ETM--HARM 78 (mutual relation); - Only by mutual interpenetration - ('sumplokè') of concepts does 'insight' arise (Sof. 259c).

Conclusion.-- "As one can see, Plato has thus arrived at the threshold of systems theory" (O.C., 54).-- Thus literally Klever. (Cfr. ETM-- HARM 93).

The tree (tree diagram) of Porfurios.

Student of the Neo-Platonist Plotinos of Lukopolis (203/269; main figure of Late Antique Platonism) was Porphyurios (Porphyrius) of Tyros (233/305). He is known for his: Eisagogè (Isagoge, Introduction) on the categories of Aristotle

In it, Porfurios applies the diagrammatic method. A diagram is a structural model,-- here in the form of a 'tree diagram', i.e. a structure with branches. The 'root' (starting point) is called 'ousia' (something, self, being).

1. A 'something' - being - can be either spiritual (incorporeal) or material (material, 'hylic').

2. A material being can be either inorganic ("mineral"; physicochemical) or organic (biological).

3. An organic being can be either plant or animal.

4. An animal thing can be either mindless or mind-gifted. In the latter case one is dealing with a human being. Cfr ETM--LOG 217; 221.

This diagram is a perfect illustration of the Platonic taxological method (diairetic: from the more general to the less general). Compare ETM--HARM 94 (concrete systems).

Abbreviated typology of layouts/enumerations.

To make the enumeration and classification theory less "empty" (clearer by scope) following applicative models.

1.-- Enumeration.

Behold a text that speaks for itself.

R.B., *Palo Alto, im Mai, Im Amerikanischen Westen: Silicon Valley (Names und Legenden)*, (Palo Alto, in May, In the American West: Silicon Valley (Names and Legends)), in: Neue Zürcher Zeitung 04.07.1990.

The author talks about the concentration of world-renowned cutting-edge technology in California -- "Silicon Valley," a group of places with resounding names, south of San Francisco: Palo Alto, Sunnyvale, Cupertino, Mountain View, Santa Clara, San Jose. One of the largest concentrations of semiconductor research and industry.

This is where firms like Hewlett-Packard, Apple, Intel, Amdahl, Atari as well as numerous smaller companies with fifty to a hundred employees design and manufacture its own specialized products.(...)"

Note.-- The enumeration will be irreducible but not complete.

2.-- Classification (typology).

Ch. Lahr, *Logique*, 606, defines the requirements of a good typology (theory of types, classification). A type (kind) is:

a. partially indistinguishable/ inseparably intertwined with other types,

b. partially distinguishable/separable from those same other types (species). Now follow a series of examples

2.1.-- Ontological.

1. We saw, so far, Antique-Greek philosophy get off the ground in currents:

a. the Milesian thinkers of nature (‘fusio.logoi’, ‘fusikoi’, i.e. those who forged the ‘fusis’, Lat,: ‘natura’, nature (ETM 10; 05 (Thales); 40);

b. the Paleo or Ancient Pythagoreans (ETM, 03/05; 06 (Medicine));

c. the Eleates (ETM 08 (Parmenides; Zenon); 11 (theology);

d. the “Dialecticians” with Herakleitos of Ephesus (ETM--HARM 160).

As an aside, this historical enumeration covers types of thinking, all of which are indistinguishable in that they want to ‘think’ (philosophize), but at the same time are distinguishable in that they ‘posit’ (= presuppose) each of their own, sometimes with the other thinkers radically incompatible presuppositions (ETM 02: hypothetical method).

We denote them as equally random samples in the total reality. Which amounts to induction.

2. - Let us consider the last of these, Herakleitos of Ephesus. When one tries to organize the fragments, which have been handed down from him, to a coherent ‘system’ one comes across an ontological tripartite:

a. Nature (he continues the Natural Philosophers of Miletos);

b. The deity (related in this to the Eleates and others),-- something in which he comes across rather as a ‘pantheist’ (the deity coincides with the cosmos); which does not prevent him from seeming to assume a plurality of deities; nature is the encompassing ‘deity’ somewhere.

c. The soul (related in this to the Pythagoreans and others, who attributed a very central place to the soul, in that it is attuned and to nature and to the deity).

Well, consider the title of the great German Rationalist Christian Wolff (1679/1754; a Leibnizian): “*Vernünftige gedanken von Gott, der Welt und der Seele des Menschen,-- auch allen Dingen überhaupt*” (Reasonable thoughts of God, the world and the soul of man,--also of all things in general.), (1719).

This is Wolff’s main work: it still exhibits, after centuries, the ontological triad.

Which suggests that this classification betrays something fundamental.

Only the Skepticists-among them the Atheist thinkers-who adhere to the immediately given (ETM 17: phenomenal point of view in sometimes a very exclusive sense) deviate from this three-way division.

i. Deity (however thought of),
ii. world (nature) and
iii. human soul

All three are "being" (reality types), but they are so in thoroughly (fundamentally) different ways: they are reality types ("real"), but only reality types ("types" of reality).-- At least in the non-Skepticist traditions.

2.2.a.-- *Cosmological.*
Bibl. s.: Vladimir Soloviev, *La justification du bien*, Paris, 1939, 182ss..-- Soloviev belongs to the Russian Realists, and specifically the Christian Realists: for them, what Christianity, especially the Gospel, offers is "real," -- more than a bunch of "names" (as the Christian Nominalists claim).

Thus, e.g., the miracles of Christ are "real" and the stories about them are true to reality ("real"; hence the term "realism"), more than mere "symbolic" stories.-- The Russian Christian Realists, then, are thoroughly Platonizing.

Solovjef, in mentioned pages, lists the reality types.

a. The basic concept governing classification is two-part, as in Platonic taxinomy (ETM--LOG 230):

a.1. Volatility regarding "reality" ("being"),

a.2. Gradation regarding fullness and indeed evolving - evolutionary, 'evolutionary' - gradation (time plays an essential role).

b. Solovjef begins by not denying the established facts of biology regarding fossils: "One cannot deny evolution. It is a fact" (o.c., 192). But he does this in a Biblical-Platonic sense: he includes Christianity, realistically interpreted, in God founds in an ascending line a creation which increases in fullness (cf. ETM-HARM 166 (dissipative structures)): five "realms" are distinguishable.

(1) The inorganic realm - mineral 'realm' also called which includes all the inanimate;
(2) the plant kingdom (biological type 1);
(3) the animal kingdom (biological type 2);
(4) the human kingdom (biological type 3);
(5) The Kingdom of God. Solovjef, as a deeply religious 'Orthodox' Christian, situates the Kingdom of God, founded by Jesus, in the series of evolutionary 'fullnesses', as the fullest degree of 'being'.

Note.-- Another cosmological classification reads as follows:
a. the earth (globe);
b. the airspace (atmosphere);
c. the sidereal sky (of stars especially);
d. the extra-sidereal sky (i.e., the "space" located outside the expanding (expanding) universe, since the big bang ("big bang")).

The four parts are "cosmic" (making up the universe), yet they are it in very distinctive ways. Yes, in separable ways

Note.-- In some circles, the extra-sidereal sky is called "'the aura or radiating belt of the material universe." This name, of course, puts forward the notion of "aura" (halo),--a notion that has only transempirical (transrational) value (ETM 18), unless one denotes something like Kirlian photography as "empirically" resp. "rationally" valid.

2.2.b. ***Metallurgy.***
Bibl. s.: G. Verbinnen, File*: New materials* (The future has begun...), in: Academic Times (KUL) 24 (1990): 1 (January), 11/21.

Materials research, worldwide, is considered a "priority research area". "Today, the number of materials offered to the engineer (...) is estimated at 50,000 to 80,000" (A.c.,13). Microelectronics and aerospace, as well as biotechnology, have seen sensational results,-- thanks to "new materials.

a.-- Definition.
Materials are called "new" ("advanced") if they:
i. exhibit a new composition (microstructure),
ii. have improved functional or operation properties,
iii. linked with other production techniques to enable new applications.

b.-- Classification.
Three major "families" (species, types) :
i. metals (strong, malleable, not brittle, conductive to heat and electricity);
ii. ceramics (hard, brittle, heat and corrosion resistant);
iii. polymers (corrosion resistant, light, easily machinable).

As an aside, they are usually made from organic substances (petroleum is the main raw material).

Behold how classification establishes order in tens of thousands of data,--evidently cluttered.

2.2.c.-- ***Humanities.***
Bibl. s.: Cedos, *Enquête: le troublant malaise des cadres*, (Survey: the troubling malaise of executives), in: Journal de Genève (22.10.1990).

Corporate executives, in Switzerland, are living through a profound malaise (unease). 1. Computerization, 2. new technologies, 3. too rapid restructuring of companies are causing a profound uneasiness - with e.g. heartburn, insomnia, headaches, concentration problems - among + 600 (out of 2000) executives, who responded to a scientifically prepared questionnaire.

Seven types emerged.

1. 18%: young, still hopeful and "ambitious" youth;

2. 25%: 40-somethings who hesitate and work very hard to still "get ahead";

3. 16%: more than 40-somethings who consider themselves perfectly successful; 7%: more than 40-somethings who live through the feeling of "having failed."

4. 25%: of-all-ages who, with little formation, "tried far anyway."

5. 7%: indifferent people who work as "non-involved" in their businesses;

6. 2%: forty-somethings who are workaholics but are not interested in either money or power.

Some, when questioned, appear to continue to harbor the "ideals of May 1968" (the Hippie and Yippie generations).

Note.-- When an induction (sample set) is expressed in percentages, it is called "statistical induction" (which gives numbers different from 0 and 100).

Note.-- It would be fascinating to find out in the same scientific way whether, among our teachers, analogous figures and qualities can be found. Especially since the Swiss induction pushes through to the explanation.

Three causes are listed:

a. the leadership of the company takes no or far too little interest in the executives;

b. the leadership lets its workmates search for the goals to be achieved such that they "don't know (well) what."

c. the leadership is moving too fast with its reforms ("restructuring") or is not preparing enough.

As an aside, those whose health breaks down blame it on "feeling powerless."

This is what a team of two psychologists, a statistician and an economist have come up with.

Note.-- The general formula of enumerative induction reads "x% of the samples is a".

1. If x is equal to 100 (all) or 0 (none) then one speaks of universal induction.

2. If x differs from 100 or 0, this is called statistical induction.

Bibl. s: W.C. Salmon, *Logic*, Englewood Cliffs, N.J., Prentice - Hall, Inc.,1963, 55f. (Induction by enumeration).-- Consider summative induction (ETM 39).

Sample 30.-- Logic: theory of understanding (induction). (236/241)

Resume ETM--LOG 212v. (connotation (content)/ denotation (scope)). ETM--LOG 215 (overall: the definition, as far as good, represents the thing to be defined in all the elements and in all the coherence);-- ETM--LOG 229 (all the elements/ parts, resp. types (types make up the scope definition (enumeration, classification)).

This involves, as a preliminary step, induction, i.e., sampling in such a way that one either summarizes (summative induction) or, even, expands (amplificative induction).

Therefore, a series of samples in what induction-either summative or summary or amplification or extension-is right.

In both cases, induction is called "generalization. However, the first generalization - the summative - is summarizing, the second - the amplificative - is extending (to all untested cases). This second is really, in the full sense, 'induction' or generalizartion.

Note.-- Induction as 'information' (truth about reality)

Reread ETM 39.

a. As summative induction, induction is backward information.

b. As an amplifying induction, it is forward information. By extending from the tested to the testable cases (via sampling), one literally anticipates future sampling.

Note.-- Situating induction in the pair "idiographic/ nomothetic" (ETM -- HARM 190), we find that in all cases induction is nomothetic, i.e., reflecting the general (the lawful). What is common to all cases exposes induction as a thinking operation.

As an aside, in the wake of Heinrich Rickert (1863/1936; successor to Windel-band; Neo-Kantian; known for his *Kulturwissenschaft und naturwissenschaft*, (Cultural science and natural science), Tubingen, 1899) and Wilhelm Windelband (1848/1915; axiological Neo-Kantism), e.g., the famous epistemologist Karl Popper (1902/1994) also distinguishes idio-graphic and nomothetic sciences.

(I).-- The summative induction. (1936/1939)

Let us begin with the simplest case, summarizing.

Bibl. st.:

-- A. Lalande, *Vocabulaire technique et critique de la philosophie*, (Technical and critical vocabulary of philosophy), Paris, 1968-10, 506/ 509 (*Induction formelle, entière, complète*); (Formal, full, complete inductio).

-- P. Foulquie/ R.Saint Jean, *Dictionnaire de la longue philosophique*, Paris, 1969 - 2, 357s. (Induction: 'denombrement entier', 'enumeration' (Descartes); induction formelle);

-- I.M. Bochenski, O.P., *Philosophical methods in modern science*, Utr./ Antw., 1961, 14.6;

-- Ch. Lahr, S.J., *Cours de philosophie*, I (Psychology/ Logique), 1933-27, 595;

-- W.C. Salmon, *Logic*, Englewood Cliffs, N.J., 1963 (Induction by enumeration).

The foundation: The range square ("logical square").

'Range' is another term for 'concept size' (the set of instances to which a concept content 'hits').

a. The premise, of course, harmologically, is always the basic differential "similarity/ coherence -- analogy (partial identity) distinction/ separation" (ETM--HARM 112). See also ETM--HARM 142; 186.

b Its structure is :

metaphor.:	all	non-all (some)	none (all not)
metonym.:	whole	non-whole (part)	not at all

Between not-all/ not-whole and no/ not at all, "just one" or "at least one" is situated. -- One sees the series "universal/ private/ singular/ no (zero)! Behold the ground structure. The actual logical square - placed in a configuration (ETM--HARM 144: polarized value set) reads::

all do	some do not
some do	some do not

Thus, the geometric form, the square, appears.

Inductive humor.

A visitor enters a small parish. Entering the church, he marvels that it is "so small."

"Surely the whole parish doesn't go in there!" he says to the co-pastor.

"Now, yes, if the whole parish went in, then, of course, it would not go in. But, since the whole parish never goes in, the whole parish goes in without question." Thus the co-pastor, who had not fallen on his tongue.

The term 'going in' is, of course, multifarious. Likewise, the term "the whole (parish)" is multifarious. Just try to formulate logically strict and not humorous.

The concept of inventory (estate description).

Consider a teacher: diligently she has improved a stack of homework. Coming to the end, she wants to know if she has improved them all.

She looks them all over one by one (review,--verification). Only afterwards does she say to herself: “I have corrected them all”. In other words: instead of speaking of one-by-one she summarizes them and says: “all”. She summarizes, totalizes -- in Platonic language “all” (ETM -- HARM 97),

Scholastic: “omne” (ibid.).-- Or think of a strict estate description of a house to be sold: a complete list of e.g. the places in it requires that the estate describer or inventory taker check and write down all of them one by one. At the end, “I have them all on my list”.

In Platonic language: ‘whole’ (the house with all places),-- in Scholastic : ‘totum’ (ETM--HARM 97).

One can see that there are two types of summative induction:
a. the metaphorical that summarizes collections.
b. the metonymic that summarizes systems.

Conclusion.-- An enumeration resp. a classifying enumeration is the result of a summative induction (ETM--LOG 228).-- Which refers to the concept of being with its tropological nature (ETM 24). Or to the concept of structure (ETM--HARM 90: relationsnet).

The inductive method.
The summative-inductive method (ETM--HARM 185) is done in two systematic steps:
a. first, each element/part of a collection/system is run through, tested separately;

b. only then are all the elements/parts of it taken together, summarized.

Definition (regulatory model).
Fr. Bochenski, o.c., 146, formulates as follows.
If g1, g2, ... gn are elements/ parts of a class/ system and they are all elements/ parts of it,
if, further, by separate (singular) test (verification), the trait (common property) k belongs to each, then k belongs to all (together, summarized).

Formal induction.
Upon verification of the elements/parts, the totality - ‘Gestalt’ - or creature form (ETM 341, ETM--HARM 129 (creature form description) - which encompasses them all clearly emerges.

This leads us to the “formal” logic (ETM--LOG 208), which focuses on summative (and also amplificative) induction.

Note.-- Summative induction as reductive reasoning.
We saw the ETM--LOG 210: "If A, then B. Well, B. So A"

Applied: "if k (kentrek, common property) verified for all data (gi, g2,..., gn) separately, then k immediately verified for all jointly (the 'summa' (Lat.: sum, totality) of all g).

Well, k verified for all k jointly. So k immediately verified for all separately.

Lapidary: from all separately to all collectively.

Reductive: if all jointly, then this presupposes prior verification of all individually. What the method expresses.

(II).-- *The amplificational induction.*
Bibl. s.:
-- I.M. Bochenski, *Philosophical methods in modern science*, Utr./ Antw., 1961, 146/155 (Induction);
-- W.C. Salmon, *Logic*, Englewood Cliffs, N.J., 1963, 53/88 (Induction);
-- Ch. Lahr, *Logique*, Paris, 1933-27, 591/597 (Induction).

Says Fr. Bochenski, 147: "'Proper induction' we call, first of all, a mode of deciding ('concluding'), -- a method of thinking, therefore, by means of which statements are drawn up."

"Second, a way of thinking that is essentially knowledge-expanding.- (note 'amplifying')"

This means that, in doing so, we are not dealing with a passing from ... the sum of individual data to the general (note: here the summary) - as with summative - also called 'complete' - induction, but with a passing from some (some) individual cases (...) to the general.
Bochenski's claim that summative induction is a "spurious induction" rests on a fallacy: no amplificative - so-called "proper" - induction is possible without a summative induction. In particular:

(1) the amplificational induction first verifies some ('some'; a subset; a portion) cases and summarizes them - summarily;

(2) extrapolates the same amplificational induction; it transcends all that has been verified (and summarized), to the verifiable,-- with the hypothesis (premise) that the verifiable cases will exhibit the same trait k, if they are effectively verified and thus join the summative induction of just now. The basic numbering is and remains the core.

Generalization.

One generalizes

(1) of the verified subset of cases (samples), summarized in the summative induction (otherwise one does not know where one stands),

(2) to the unverified, but deemed verifiable, (the hypothesis of knowledge-expanding induction) subset of possible, further cases. (samples).

This is, truly, extrapolation, i.e. one goes beyond the limits of the tested, based on a hupothesis, hypothesis.

Simple applicative model.

(1) ***Summative induction.***

I boil (some cases of water) water several times and find that, in normal cases, it boils at 100° Celsius. I summarize this: '(so far) all water boils at 100° Celsius'. This makes up a finite set.

(2*) Amplificatory induction.*

As a hypothesis, I take it that all other waters (note: dichotomy, complement ETM--HARM 125), the "remainder" (the complement), exhibit the same form of being (ETM 34).

From this I conclude that, henceforth, if I subject water to the same conditions (100° C.), I will observe the same reaction of that water (boiling).

Decision.-- From the summed backward information, I decide on the forward information (ETM-LOG 236). This involves an infinite set (all possible waters react, by assumption, in the same way in an infinite future).

A formula.

(1) "If AA, then AG" (if all separately, then all jointly),-- summative.

(2) "If AF, then AM" (if all actual cases, then, by hypothesis of the same creature form, all possible cases),-- amplificational.

The "induction problem".

Better ware: "amplification or extrapolation problem". -- "Already Aristotle (-384/-322) has shown, with admirable perspicacity, that (amplificative) induction is not conclusive. His proof of this has never been refuted until now.

And yet: the (amplificative) induction is not only applied in everyday life, but it also forms one of the main methods of the (natural) sciences.

By what right?" (I.M. Bochenski, o.c., 147).-- The answer: the hypothetical method (ETM 02).

Typology:
Bibl. s.: Ch. Lahr, *Logique*, 591.
Lahr mentions two types of amplificatory induction.

1.-- The socratic induction.
O. Willmann, *Abriss der Philosophie*, (Outline of philosophy), Wien, 1959, 112 : "In the history of logic, induction and definition occur first -- and interrelatedly -- both represented by Socrates." This is the general definition of amplificational induction: Socrates decides from singular cases (some, at least one) to the'genos' (genus), versta: universal set. He applied this primarily to ethical (concerning the conscience) and political (concerning society) problems.-- The humanities and humanities apply them.

2.-- The Baconian (causal, causal) induction.
With Anaxagoras of Klazomenai (-499/-428), the founder of the experimental method (ETM--HARM 162), we arrive at causal induction,--of which Francis Bacon (1561/1626; Novum organon scientiarum (1620)) is the modern revivalist.

Appl. model.
(1*) Summative induction.*
I situate water in a temperature of 100° C.. Reaction of the water: it boils.
a. Heating is the cause (Lat.: 'causa'; hence 'causal'). Cooking is the consequence.
b. The relationship between cause and effect -- the causal or causal relationship -- is the object of investigation here.-- I note that so far all water boils at 100° C..

(2) *Hypothesis:*
nature, including water and especially the influence of water by heat, proceeds in a regular, ordered (ETM--HARM 165: machine, closed system) manner.

Amplificatory induction.
From this hypothesis I conclude that the rest of the water, in the future, if sufficiently heated, will also boil at 100° C.-- I generalize the causal relationship between 100° C. and boiling water.

Note.-- In the wake of Phenomen(al)ists (ETM 17), one also speaks of the connection between "omen" and "sequel" (because one does not immediately see the actual causing (it is at most rationally provable)). Thus, Phenomen(al)istic; "omen --> sequel". (If omen (phenomenon 1), then sequel (phenomenon 2;1). This amounts to a very 'critical' (arch cautious) interpretation of causality processes, of course,

As an aside, this statement is controversial if one were to see cause directly.

Sample 31.-- Logic: theory of concepts (collect). (242/253)

Induction is "to expose collection" (either a finite or an infinite collection). A collection is the extent of a concept as content.

In other words: a collection depicts a concept content in its copies (applicative models). It models the original that is the concept as content.

We will now examine very briefly how mankind, from the Archaic cultural period onward, had a very clear sense of "to collect" (as a verb).

a.-- The primitive (archaic) summering.

The findings of the German physician and naturalist M.H.K. Lichtenstein (1781/1857) -- who spent considerable time in Southern Africa -- among the Xhosa (also Xosa, -- once called 'Kaffirs'; today +/- four million in Transkei and Ciskei) -- "Although they have counting words, they seldom use them: few of them can count more than ten; most cannot even say the number.

As an aside; some California tribes got even less far.-- But, according to Lichtenstein, the Xhosa possessed another, "mantic" counting ability, peculiar to Primitives.

By the way: the ancient Greeks, who knew this phenomenon, called it 'mantic' (clairvoyant, which is typical of seers). Says Lichtenstein: whenever herds of four to five hundred cattle are driven home, the owner notices:

a. Whether animals are sometimes missing (note: existence (ETM 31)),

b. How many and which precisely are not there (note: essence (ETM 33)).

Note.-- The doctor rightly says: 'the owner', i.e. the one who is existentially, i.e. with the commitment of his livestock happiness, involved with the animals, ('manticism' ('seeing', 'clairvoyance', -- also called 'sensitivity' (clairsentience)) does not presuppose cold - Modern - detachment, but warm interest.

Conclusion.-- Collecting as an act through which one summarizes, thus exists independently of the elaborated counting ability. It proceeds, in other words, intuitively.

Which, in passing, explains why there are miracles of calculation, who juggle as if they were calculators with high, opaque figures. The latter sometimes still live among us: they verify, in Modern and Postmodern living space, what Lichtenstein could objectively establish with Primitives.

Note.-- H. Poincaré (1854/1912; one of the greatest mathematicians of his day) argues first, after long experience of his own, that formal logic, whether traditional or mathematical, is only creative if it is intuitive.

This means that not a sensory intuition (contemplation) alone, but also an intellectual intuition underlies the progress of mathematics.

As an aside: for Poincaré, 'intuition' (contemplation, contemplation) is a 'synthetic' - understand: summative (summative) - faculty.

More to the point, this disposition in humans is rooted in "subliminal" consciousness. What is that? That type of awareness of things which lies below the 'limen', (Latin for) 'threshold of ordinary, day-to-day consciousness. With Freud one could speak of an 'unconscious' layer in us.

With this statement, Poincaré clearly moves away from Modern Enlightened Rationalism, since Descartes, of course. But he approaches the Postmodern insight that our 'ratio', reasoning ability (in the mathematical sense among others), is also present in Primitives, who think Premodern. Cfr. ETM 41 (ethnology).

Primitives also think, in their own way, from the 'subliminal' insight at work in their deeper souls. In the case of the Xhosa, that insight is clearly summa-tive or, with Poincaré, 'synthetic'.

Note.-- The "operative" or "operational" summation.-.
Now do not think that Primitives do not also know the other type of mathematics.

Appl. mod.
The story goes that, e.g., in West Africa, among Negro Africans, the chief gives his village heads a "collection" ("summa" in Latin, sum) of sticks.

By taking away - from the day of the farewell, after the meeting - exactly one stick each day (i.e. from the totality ('summa') of the sticks), the illiterate and mantically non-gifted village head knows, in a childishly simple way, the correct date of the next meeting.

Isn't this a curious little example of 'summarizing' (from all separately to all collectively)? Who claimed there again that the new mathematics, with its pedestal of set theory, is 'new'? As a formalized system, yes -- as intuitive thinking, certainly not.

Note.-- Immediately we have one example of praxeological arithmetic, i.e., arithmetic with 'praxis', action. Man also thinks while acting.

b.-- The antique Greek summering.

"The Greeks were the first to make mathematics a science" (Sir Thomas L. Heath, *A Manual of Greek Mathematics*, New York, 1963-2, 1).

More accurately, "Mathematics began as a science when someone--probably a Greek--first attempted to prove theorems about all things and about some things,--without specification of certain individual things.

Such propositions were first posited (op.: presupposed) by the Greeks for geometry and, as a result, geometry was the Greek mathematical science par excellence.

After the rise of geometry, it took centuries before algebra was really set up effectively,--despite a few feeble attempts by later Greek mathematicians." (A.N. Whitehead, *Mathematics, basis of exact thought*, Utr./ Antw., 1965, 11).

After ETM--HARM 104 (Pythagorean number concept, fusion of space and number mathematics) we understand, a little, what Whitehead says regarding Greek mathematics and its "geometric" nature.

The platonic 'stoichiotic' method.

'Stoicheion' (ETM-HARM 125;-- ETM 37) means, in short, 'element' or 'constituent'. The term 'stoicheiosis' means to analyze something in its elements and/or constituents (collection, system).

The stechiotic method,

at Platon, is one type of summering.

Bibl. st.: E.W. Beth, *The Philosophy of Mathematics (From Parmenides to Bolzano),* Antw./ Nijmeg., 1944 29/56 (Plato (-427/-347)).

(1) The Atomist (also: Atomist) Demokritos of Abdera (-460/-370), who assumed an unlimited multiplicity of purely quantitative 'elements' - 'atoma', atoms, i.e. elements which are not further divisible - as a premise of a strongly Materialist interpreted universe, uses as a metaphor (model) for these elements the letters of the Greek alphabet.(o.c., 37).

(2) Platon takes up that thought but reframes it.

a. In *Theaitetos* 201c, the letters of the alphabet are used to clarify the concept of element. (O.c.,35).

b. In *Filebos* 18b/d, Platon makes the "stoicheiosis," factors analysis, the stoichiotic or factors analytic method. (O.c.,36).

Appl. model.

Among the Egyptians, the deity Theuth (Thot) was considered the founder -- savior, healer -- concerning the hieroglyphic alphabet.-- See how Platon elaborates this as a model for the stechiotic method.

"When someone, either a god or a divine man, - according to an Egyptian story his name was Theuth - came to the realization that all that is sound was infinitely diverse, he was the first to come to the following insights.

A.-- A multitude

a. In that limitless variety, there is not a single vowel but there is a multitude.

b. Further: there are other sounds which, although not vowels, still exhibit a certain sound value: there is a certain number of these as well.

c. A third kind: we now call them "consonants. Thereupon he split the consonants until he distinguished each consonant separately. Likewise the vowels and semi-vowels, until he knew, of these too, the right number.-- each of them separately and all together he calls letters.

B.-- One coherence

However, he recognized that none of us could learn one letter separately without all the others (*note*: dichotomy, complementation (ETM--HARM 125)).

Believing that all letters form one coherence, which makes them all 'one' (ETM 29: henology), he assigns to them a science, the art of speech (grammar) (O.c.,36v.).

Behold what Beth communicates in this regard. It is clear that Platon is overwhelmingly applying summative induction here, -- presupposing them as known or seen, unconsciously.

As an aside, the Cartesian method - 'analysis/synthesis' (ETM--HARM 189) amounts to a Modern re-foundation (updating) of ancient Platonic heritage.

A comment.

Platonism is characterized by the hypothetical method (ETM 02) of which we have already seen several examples. E.W. Beth noted this sharply. He says what follows.

Platon argued that something can be presupposition ("hypothesis") of something else in two ways.

1-- It can as a premise situate itself within that other something. Aristotle then calls this "element" (as a letter of an alphabet situates itself within that alphabet).

2.-- It can situate itself outside of it.-- Aristotle then calls this 'presupposition' ('principle').

With Platon - Beth wants to say - én element, inside or outside something that is examined for its presuppositions, and presupposition (hypothesis), which makes something intelligible, still run together. In a certain sense rightly so. Because a whole becomes comprehensible when one puts the parts first and vice versa. Something becomes intelligible - even when one presupposes things outside it.

Note.-- Aristotle was Platon's very independent student, who further and brilliantly elaborated the "formal" or formal logic, in its classical form.

Ch. Lahr, *Logique*, 591, gives from Aristotle a sample of summative induction,--in the form of a typically Aristotelian closing speech or "syllogism.

Lahr refers to this as 'induction aristotélicienne' (Aristotelian induction). In his Analyt. 2: 23 Aristotle says:

major (first preface): Man, the horse and the mule live long;
minor (second preface): well, these three species are the only animals without bile;
conclusio (conclusion, derivation): so all animals without bile live long.

Here Lahr notes that Aristotle gives a complete enumeration (ETM--LOG 229: all just once), "enumeration complete. Which is evident from the term 'any' (animals)".

The syllogism is based on merely invented concepts, of course. Man does have a gal, e.g.. But we give the syllogism anyway! Why? Because it shows that although the prepositions contain falsehoods, the derivation as such (= in itself) is correct. The actual Aristotelian form should be hypothetical: if man, the horse and the mule live long and (if) they are the only species without gall, then all animals without gall live long.

Note.-- In the wake of Greek antiquity, the Scholaticians also knew summative induction. It was called, in Middle Ages Latin, "inductio per enumerationem simplicem" (induction by simple enumeration).

Its preposition, in the same Latin: compositio logic, logical totalization (summering), which founds an "omne" (collection); compositio metaphysica or compositio physica, metaphysical or physical summering, which founds a "totum" (system).

Cfr. Kard. D. Mercier, *Métaphysique générale*, (General metaphysics), Louvain/ Paris, 1923-7, 156ss.. Cfr. ETM--HARM 97.

C.-- Modern summering.

We analyze a peculiar form a little more closely, because it makes the key to thinking and calculating with letters, instead of numbers, more understandable.

Bibl. s.: O.Willmann, *Gesch. des Idealismus*, III (*Der Idealismus der Neuzeit*), (Idealism in the Modern Era) Braunschweig, 1907-2, 46/59 (*Einflusz des Pythagoreismus auf Mathematik und Astronomie*), (Influence of Pythagoreanism on Mathematics and Astronomy).

1.-- The lemmatic-analytic method.

"Of Platon it is mentioned: "He, being the first, instituted the research by means of 'analusis' (analysis), Theodamas de Thasier." (Diogenes Laertios (+200/+250), History of Philosophy iii: 24)" (O. Willmann, o.c. 48).

This method consists of two aspects.

a.-- The lemma (prolepsis).

'Lemma' - 'prolepsis' (anticipatio) - is 'to seize ahead', 'to anticipate'.

1. Mathematicians, in particular, invariably start, in the solution of questions, from a systechy, viz. "given/ sought (asked)". All the unknown is possibly the wanted. The basis of the search is the known, i.e. the given.

2. The sought, the unknown, however, is always somewhere already 'known' if not one would not seek it. This is the infamous 'circle of interpretation'.

Mathematicians act as if they already knew what was being sought, Model-theoretically: they act as if the original (the unknown sought) was already a model (the known) somewhere. They express this in phrases such as, e.g., "Suppose we already solved the problem, what follows?"

b. -- The "analusis" (analysis).

One investigates, via the 'complex' (= connection, structure) in which it is found, the wanted. After all, that connection 'betrays' somewhere what the wanted is.

So this is the indirect method, as Platon designed it, where he says that a something can have something else, outside itself, as a premise (means of understanding). See ETM--LOG 245 (second hypothesis).

O. Willmann, o.c., 48, notes here: the characteristic is the lemma, i.e., the presupposition as known (which is a form of hypothetical method) of the unknown. "Fundamentally, the name 'proleptic or lemmatic method' would be better than the name 'analytic method' since 'analyzing' the connection ('Complex') in which the unknown is contained is only the second step."

The algebraic application.

O. Willmann, *Abrisz der Philosophie*, Wien, 1059-5, 137; says: "On this method the whole algebra rests".

Finding unknowns in mathematical equations relies on such a lemma.

a. Medieval mathematicians denote the unknown value by the term "remainder" (the matter at hand), using a kind of curly sign.

b. Later especially after Descartes, one writes ‘x’ (the unknown). Thus, as Willmann rightly says, the unknown value, i.e. the wanted or original, is introduced lemmatically, i.e. provisionally-hypothetically, as an ‘x’.

Thus one has at one’s disposal an admittedly provisional but nevertheless real mathematical model, the ‘x’. That this is a real model, i.e. an informative sign, is shown by the fact that one can perform endless mathematical operations with it.

Appl. model.
To indicate the algebraic formula of the circle e.g., one writes: $x^2 + y^2 = r^2$”, in which three such lemmata, signs for the unknown.

2. The letter math since Fr. Viete (1540/1603).
The mathematical method of Vietta (the Latinization) is a long elaboration of the analytical method in Platonic spirit.-- A simple model.

the concept of sum	the concept of sum	a universal sum
A number 1 + a number 2	3 + 7 = 10	A + B = C
gives a number 3.		
universal	non-universal	universal
non-operational	operational	operational

As Willmann, o.c., 49, says: by introducing letters instead of numbers, on a large scale, Viète actually introduces universal concepts (as number concepts), but in a mathematically editable (‘operational’) form.

Instead of ‘logistica numerosa’, numerical calculation, Viète de Moderne begins ‘logistica speciosa’, letter calculation, better translated: ‘concept calculation’. After all, in Latin, ‘species’ is the word for ‘understanding’ (here summarizing for a series, if necessary an infinite sequence or collection of numbers).

Conclusion.-- A summering of all possible number values is hidden in the letters.

Logical syntax.
Now reread ETM--HARM 84v. (logical syntax). Instead of talking about number sets, it talks about sentence sets there.

Conclusion: the XIX- century logic (literally: arithmetic) is only a further extension of a Viète’s summering method, which still limited it to letters-by-numbers. Mathematical logic is arithmetic with letters-by-concepts or letters-by-judgments.

3. Remarks by A.N. Whitehead.

What Willmann writes about Platonizing regarding computational thinking is explained by someone like Whitehead, *Mathematics, Basis of Exact Thinking*, 11vv. (Changing), is explained as follows."

a. "The notions of 'all' and 'some' are introduced, in algebra, by using letters instead of the fixed numbers of arithmetic.

Instead of saying, e.g., that 2 + 3 = 3 + 2, we generalize in algebra and say that "for all numbers x and y, "x + y = y + x" holds": Similarly, instead of saying that 3 > 2, we generalize and say that "for all numbers x some y exist such that "y > x":

b. Whitehead adds, "After the rise of algebra, the differential calculus was invented by I. Newton (1642/1727) and G.W. Leibniz (1646/1716). After that, the progress of the philosophy of mathematical thought - as far as these concepts are concerned - remained static. Only in the last few years has it been realized how much the concepts of "all" and "some" belong to the foundations of mathematics. As a result, more and more subjects have been made accessible to mathematical research".

Note.-- In 1686 appeared from I. Newton: *Principis mathematica philosophiae naturalis*. In 1910/1913, by B. Russell (1672/1970) and A.N. Whitehead, one of the principal works of current logics (mathematical logic) appeared, *Principia mathematica*, which attempts to reduce mathematics to logic.

We believe that we have, with this, given some sense that our chapter on summarizing, collecting,--inducing is indeed one of the most thorough of this course.

As an aside, ETM--LOG 215 ("preliminary definition"), -- 221 (partial characteristic),-- 224 (first approximation of the case itself, the name) give us non-mathematical applications of the lemmatic-analytic method.

In other words: the lemmatic-analytic method, one of the forms of hypothetical method, is multiple in its applications.

More to the point: apart from purely theoretical-mathematical and logistical areas, our thinking may be purely lemmatic-analytical (phallibilism: ETM 04). From what? Because of the total reality we understand nothing but parts (aspects elements). Namely thanks to inductive sampling. That is precisely why this course is a series of 'samples'. Nothing more.

Note.-- R. Descartes (in Latin: Cartesius,-- from which 'Cartesian' as an adjective; founder of typical Modern Rationalism) knows induction "par denombrements entiers" (induction based on complete enumerations).

Cartesians like Antoine II Arnauld (1612/1694), Pierre Nicole (1625/1695), in their famous Logique de Port-Royal (1664, describe "l'induction entière" (understand: general or summative induction) as follows.

(1) The major (first preposition) and the minor (second preposition) of a syllogism--see, e.g., the Aristotelian syllogism, ETM--LOG 246, as an example--contain information, insight.
(2) In the conclusio (afterthought, conclusion) this information returns in summarized form.
Or: **(1)** what the two syllogism prepositions teach (impart information to),
(2) that runs, logically-stranded, on the after sentence in summary form.

Note.-- The operative (operational) model.
ETM--LOG 250 taught us a Primitive Model of this .

Bibl. s.: John Stuart Mill (the son of James Mill; 1806/1873), *A System of Logic, Rational and Inductive* (1843).

We repeat: "Do a certain thing, and thou shalt obtain a result" is the praxeological (also : 'paxiological') axiom. But note: the doing is decisive, but not 'irrational doing'! The 'doing' is done 'rationally', - among other things, according to a reasoned process.

In the following example, it is assumed that a circle - 'kuklos', cycle - can be defined as a line such that all points of it - one by one - are traversed just once with the premise that beginning and end points coincide (reflexive or loop motion). Cfr. the other way of defining, ETM--LOG 224.

Appl. model.
(A) Problem.
Given: a landscape with a well-defined structure.
Asked (sought): provide operative evidence of the fact that said landscape is an island.

(B) solution (= analysis).

(B)1. Abduction (= hypothesis, regressive or backward reduction).
If all natural landscapes, according to their form, explorable by a loop road, are 'islands' and if this natural landscape here and now (= singular) is such an 'island', then anyone can walk e.g. by water - around it, a loop road.

(B) 2. Progressive reduction (forward reduction,

also called "deduction" for short). This stage of reasoning--reductive reasoning (ETM--LOG 210; see also 239)--is called a design of trial-and-error or experimental testing from the abduction above 1. deduced' (hence, the name 'deduction'). Here: 'so, if I take a boat on which I make a round trip - in the strict sense of "round trip" - then I provide the operative proof (the experimental proof) of the fact that the said landscape is indeed (findable, testable : ETM 09) an island.

(B)3. Full, 'peirastic' induction.

At this stage of reasoning, one is up to the execution of the designed experiment. Which ends either in verification (confirmation) or falsification (denial).

As an aside, Aristotle, *Soph*. el. 8:2, called "he peirastike" (subj.: 'technè') "all that is probing or testing." 'Peirasmos', in Antique Greek, after all, is attempt, trial, experiment (experimentation).

Conclusion.-- The typical Anglo-Saxon J. St. Mill supplies us with this primordial example, worthy of an elementary school, the paradigm (Th. Kuhn of trial-and-error summering. After all: all right once are summarized.

The general conclusion: topical set and systems theory.

Just reread ETM--HARM 90vv.: structure (distributive: collection/ collective: system).

Bibl. s: E. Bouqué, *The algebra of sets*, Ghent, 1967.

As an aside, Georg Cantor (1845/1918) is the re-founder, in a formalized way (ETM--HARM 94: language systems) of an ancient thought movement, the summering (summative, extending to amplificative if necessary). Cantor published his Mengen-lehre from 1874 to 1897.

In his *Beiträge zur Begründung der transfiniten Mengenlehre* (Contributions to the foundation of transfinite set theory), (1895), Cantor defines - not mathematically strict defining: "By 'Menge' (collection) we mean:

(1) each summary into a "whole"

(2) of certain, well-defined objects either of our sensory perception or of our thought ('objects', which are called 'elements' of the set)."

Decision: Menge, set, ensemble, collection exists when one:

(1) has well-defined elements,

(2) summarized into a "whole" ("jede Zusammenfassung zu einem Ganzen"), (any summary to a whole). Reread Bochenski's definition, ETM--LOG 238: it is just the same.

As an aside, a system is one type of collection (the common denominator is the fact that all the elements belong to the same cohesion).

Note.-- E. Bouqué, *The Algebra of Collections*, 13, says that -- to know whether "something" (creature form) belongs to a collection (and we add to it to a system), -- one can employ two coherent aspects for testing.

a. The enumeration of all elements,--each right once (ETM-LOG 229: enumeration/classification),

b. Indicating a common property (ETM--LOG 212: connotation (concept content)) are jointly a 'mutual' (symmetric) relation (ETM-- HARM 78),-- distinct, but not separate.

As an aside, indicating the feature(s) some mathematicians call "abstraction principle" because "abstracting" means "to dispense with each element as a separate thing," so as to be left with its summary.

Cultural History Comment.

Bibl. s.: J.W. Dauben, *G. Cantor and the Origins of Transfinite Set Theory*, in: Scientific American, vol. 248 (1983): June.

Dauben labels Cantor's contribution to contemporary mathematics as "a theory that provides a foundation for virtually all contemporary mathematics."

Two facts:

a. Cantor was crushed by the massive misunderstanding of his contemporaries - mathematicians;

b. as a deeply disillusioned person, he was admitted, at Halle, to a psychiatric clinic, - where he died.

The statement.

"If facts, then statement (put first to make the facts understandable). Well, facts. So statement". That's the reductive schema.

a. Did Cantor collapse psychologically because he was unable to process massive misunderstanding? That would imply a causal relationship between "unprocessed incomprehension" and "psychrisation". Cfr. ETM -LOG 241 (causal induction).

b. Dauben says that the reports from the Nervenklnik (Mental Health Clinic), at Halle can be interpreted ("explained") as manic-depressive psychosis (a soul disease with highs and lows) as well.

The theoretically successful work on the foundation of mathematics would then be due to his malady itself: in the manic (= 'himmelhoch jauchzende') phase he would have received brilliant intuitions. In that case Cantor collapsed due to a persistence of the depressive side of his malady. Which is also a causal explanation but a different type of it.

The peculiar lack of understanding

(1) J. Dauben provides facts.

Leopold Kronecker, one of Cantor's teachers and top figure of established German mathematics at the time, even attacked Cantor himself personally: he wrote him off as "a scientific quack," -- more to the point, "an apostate" (think of the ecclesiastical term by which someone was written off for the church) and, like Socrates in his day (accused in the Athenian court of juvenile confiscation), "a youthful spoilsport."

(2) J. Dauben provides facts.

Henri Poincaré (1854/1912) - according to A. Dumetriu, H. Poincare, in: D. Huisman, *dir., Dictionnaire des philosophes*, Paris, PUF, 2092, "un des plus grands mathématiciens de son temps" (one of the greatest mathematicians of his time) - condemned the theory of transfinite numbers introduced by Cantor as "a disease from which mathematicians would, in time, be cured".

Note.-- Have all these learned gentlemen then never had any awareness of the ancient intuitions that Cantor actualized in his theory?

"The New Mathematics.

As an aside, a book of very brief interest to us here, viz. Moshé Flato, Le pouvoir des mathématiques, Paris, Hachette (questions de sciences).

1. The author outlines some features of mathematical research,-- describes the relations of mathematics to other sciences (logic and computer science (he emphasizes the distinction),-- statistics,-- physics, biology, economics),-- characterizes the mathematician as a human being.

2. His thesis: "In terms of education, the new mathematics is 'un échec' (a gaffe)".

Explanation.

i. Flato acknowledges the good intentions of the mathematics reformers in the late 1960s.

ii. But two mistakes were made.

(a) One has introduced a mathematics that is "cut off from its intuitive basis in order to make it all the more abstract"; this for children in a very early age.

(b) People proceeded as if teachers' preferences and concrete capabilities simply did not exist.

The author admits that both errors did substantially undo.

Nevertheless, he maintains, "Mathematics teaching still often remains too abstract, unilaterally emphasizing its axiomatic side and not the fruitfulness of entering, in a profound way, into singular examples."

Sample 32.-- Logic: concept theory (algorithm). (254/261)

By way of introduction.-- Reread ETM--LOG 243 (operative summarization), 250 (operative model). - Now reread ETM--HARM 95 (goal-directed system) -- with the concepts of operative mode and goal-directed system, we have made intelligible the two major postulates--hypotheses--that algorithmic work.

An algorithm, after all, is a goal-oriented or teleological system of operations - 'praxeis', 'operationes' -. We are in full praxeology.

The praxeological definition.-

Ch. Lahr, *Logique*, 497.

One can define something - says Lahr - by describing how one goes about achieving it. As an Applicative model, he suggests the industrial definition. For example, "paper" is

(1) initial situation: a kind of "linen",

(2) algorithm: processed in the pestle,-- reduced to dough,-- made white by chlorine,-- etc. ,

(3) such that one achieves the end product (goal).

Note.-- It is clear that 'infrastructure' (the things needed) includes a range of goods. These are enumerated in part in the industrial definition. Thus, e.g., pestle,-- wood, chlorine, etc.. In other words: the complete enumeration of the infrastructural elements -- all right once (ETM -- log 229,-- 236, 252) -- is an integral part of the industrial definition.

'Algorit(h)me'

Our Modern algebra dates back to the Indians and to the Greek Diofantos of Alexandreia (+/- +250; *Aritmetica* (13 books)).

Around 825, in Baghdad, the Islam mathematician al Chwarizmi wrote a work on the rules of arithmetic common in India. In the XIIth century this was translated into Latin with the title *Algorismi de numero Indorum*.-- The term "algorithm" comes from the name of the Islam scholar.

One can define an algorithm as follows:

(1) placed in a problem situation (= given),

(2) what to do (algorithm: set of actions as means),

(3) to achieve the stated goal (asked)?

In other words :

(1) initial situation,

(2) algorithm,

(3) end situation. Thus, an algorithm is the intermediate term, a set of acts, between an initial and an final situation.

One more feature: the Cartesian method (ETM--HARM 189). The totality - known only through summative induction (which proves once again the basic role of summering) - of the 'steps' (deeds) is gone through one by one. Cfr ETM--LOG 243, 250.

Typology.-- We now give a set of types of algorithm to make the general and 'abstract' (seemingly alien to life) concept clear (content) and lucid (scope) - ETM--LOG 212 (Leibniz).

1.-- Magic model.

Archaic magic is teeming with algorithms, -- like contemporary ones, for that matter.

Bibl. s.: Eve Marie Helm/ Edith Schindler, *Speis und Trank im Aberglauben*, (Food and drink superstition), Stuttgart, AT Verlag Aarau, 1986.

S. 14: "Will ein Kind nicht reden lernen, musz man ihm Majoranwasser zu trinken geben" (If a child does not want to learn to talk, he must be given marjoram water to drink.), (note: 'Majoran' is 'marjolin'). The algorithmic structure is clear.

(1) Problem situation: a child does not learn to speak.

(2) What to do. Give Marjolin water to drink.

(3) Result: the child learns to speak.

S. 15.-- Here the intermediate term between the beginning (problem) and the end (solution) is a multiple of acts. With which we are in full algorithmic mode. See here the full text.

"To fall in love.

(1) In a sage leaf one puts, with a needle that has never been used, three holes. On top: one's own hair and one hair of the person to be made in love is pulled through conscious holes.

(2) The sage leaf one rolls up, afterwards. One wraps it in wax that has never been used.

(3) One places the sage leaf on a baptismal font (baptismal basin), while saying, "I baptize you in the name of the Father, the Son and the Holy Spirit. Amen".

(4) If thereupon one buries the sage leaf in the earth in a place which the person to be made in love often enters, then this person will fall in love only with the one who has acted on it with this love spell." So much for the text.

Structure.

(1) ***problem situation (one desires the "love" of a Person).***

(2) ***algorithm*** (a series of actions performed in magical order, -- with the necessary infrastructure (sage leaf, two hairs, wax, baptismal vessels, words (the Three-One Formula, but not simply as a prayer, but as a magical prayer,-- to 'dynamize', i.e., to intensify, the 'life-force' (ETM 05: 'dunamis')), the earth (to be revered as the Earth Mother, i.e., as the Great Goddess of magic in the Pagan sense), digging agent).

(3) ***problem solving***.

2.-- kitchen or culinary model.

Kitchen books are full of algorithms.

One example.

Bibl. s.: Da Mathilde, *325 recettes de cuisine créole*, (325 recipes of Creole cuisine), Paris, Ed. de la Pensée Moderne, 1975.

Immediately we find ourselves in Guadeloupe and Martinique, “where the tropical sun dwells, as it were, in the food itself.” In the Antilles, “Da” is the same as “Aunt”. Da Mathilde is a Creole who was put to work in the kitchen from the age of fifteen. She became a “culinary celebrity. O.c., 216s.:

Riz doux au lait de coco.

(A) ***Ingredients.***

The infrastructure is: 1 well-ripened coconut, 1 handful of washed rice (per person), 1 tablespoon of powdered sugar (per person), 1 piece of cinnamon, a little nutmeg, juice of green lemon.

(B) ***algorithm***

(1) To strip the coconut of its bark. Pierce with a nail that one beats into the head holes.-- Collect the fruit juice in a bowl.

(2) Breaking the nut with an axe. Fluffing the debris so that the brown epidermis is eliminated. Grate.-- Result: a mush.

(3) Spill the mash into a bowl. Pour out the bowl with the fruit juice in it. Add a glass of water to it.

(4) Place this rather liquid mash in a large enough piece of gauze or tulle. Wring out over a container.

Result: a rather dry mush. Meanwhile: gently cook the rice on a fire until it is really cooked through.

(5) Mix rice and coconut milk. Add sugar, as well as nutmeg and cinnamon.

(6) Let it soak.-- Enjoy”. -- Da Mathilde ranks this with the desserts. The structure should be clear enough by now.

3.-- Semiotic algorithms.

Please reread ETM--HARM 81;-- 84/85; 98.

The structure.

(1) initial situation -- One assumes an initial sign (symbol).

(2) algorithm.-- One applies a uniform operation to it such that a series of new characters (symbols) is created. This monotonous process is also called “character generation”, -- generation.

(3) Result: A final situation such that with the initial sign a semiotic algorithm was ‘generated’.

3.a.-- Paleopythagorean model.

We already saw one model: ETM--HARM 104 (squared numbers). Here the repetition of the same act. (= one of the structures of algorithm) accumulating, ‘cumulative’.

3.b.-- Peano’s model. (256/260)

Cfr. ETM-HARM 85 (pasigraphy).-- Giuseppe Peano (1858/1932), pioneer on axiomatization of mathematics, was greeted with sarcasms by H. Poincaré, while Gottlob Frege (1848/1925; renowned axiomaticus mathematician) and B. Russell valued him as a very valuable mathematician.

Cfr ETM-LOG 252 (Cantor's case). In his *Begriffschrift (Eine der arithmetischen nachgebildete Formelsprache des reinen Denkens*), (Conceptual writing (a formulaic language of pure thinking modeled on the arithmetic one),), Halle, 1879-1, 1891-2, Frege reacted completely differently from Poincaré: he too wanted an 'ideography' (= Begriffschrift), i.e. a sign system that works only with unambiguous terms and not with ambiguous ones, like everyday, 'natural' languages, in which the meanings of terms depend too much on the concrete context (cfr ETM 25/27).

In short: once a single sign has been defined, it remains mordant, until the end of the logical and/or mathematical text, to preserve precisely that single meaning. So that misunderstandings are excluded.

Thus 'pure thinking' (as G. Frege says in the subtitle) is possible: from 'natural' speaking (writing) becomes 'exact'.

Appl. model.-- To understand very correctly what a mathematical algorithm is, one should know what "mathematical induction" is.

By the way: H. Poincaré sees in it "an endless series of concluding steps (syllogisms), which (instead of through a series of operations) suddenly reach the conclusion (conclusion, afterthought)". Immediately Poincaré sees in it one of the possible proofs of the fact that man 'subliminally' (ETM--LOG 243) grasped and summarized meanings. Cfr A. Dumitriu, H. Poincaré, in: D. Huisman, dir., *Dict. des Philosophes*, 2092s..

Giuseppe Peano (1858/1932), for forty years a prof in differential calculus at Turin, introduced, in arithmetic (with time in all mathematics), pasigraphy (ETM--HARM 84), an analogue of Frege's ideography (conceptual writing) in the wake of Fr. Viète's letter arithmetic (ETM--LOG 248).

To proceed in a pasigraphic way is to introduce an exact (working with (one-syllable) characters) logical-mathematical drawing system. This,-- together with axiomatization, i.e., putting forward mathematical 'hypotheses' (ETM 02: hypothetical method), -- formerly called 'axiomata' and 'postulates', -- now called only 'axiomata'.

In short: Peano as a pioneer introduced both exact and axiomatic thinking.

Example.-- In *his Formulario mathematico* (1894/1908) he proceeds, approximately, as follows.

(a).-- 'Primitive' concepts.

'Primitive' means, here, "merely presupposed" (as a hypothesis).

Peano states

(i) Logical notions first,-- so e.g. ').' (in other sign systems: ⊣ e. 'involves', 'involves' (implication sign);-- cfr. ETM--HARM 81; he states:

(ii) collection theorems first,-- so e.g. 'Cls', i.e. 'class' (collection),-- '**ℰ**' (belongs to, belong to); he states:

(iii) number mathematical concepts first : 'No' (number), '0' (zero), 'a' (a number), 'a+' (successor of a). Other numbers are defined thereon as follows : 1 = 0 + ("1 is the successor of 0"); 2 = 1 + ; 3 = 2 + ; etc..

Note.-- The binding word 'and' is written as '.' (a period).

(B).-- *'Primitive' propositions (judgments, statements).*

These are the 'axiomata', preconceived judgments. We distinguish two groups.

(B).i.-- *More general axiomata.*

Here they follow.

(1) 'Number' (No) is a class or species name.- Pasigraphically: No **ℰ** Cls. (Number belongs to class); i.e.: numbers together are a kind of collection (class).

(2) 'Zero' (0) is a number.-- Pasigraphic : O **ℰ** No.

(3) "If a is a number, then a + (the successor of a) is also a Pasigraphic: a E No). a + E No.

(4) The 'postulate' (axiom) of mathematical induction.-- Now reread ETM--LOG 239 for a moment: from summative (summarizing) to amplificative (knowledge- or information-expanding) induction.

"If s is a class (Cls), of which 0 (zero) is a member ('element') and, if every (// all) member of s has a successor (a +) within the class s, then every (// all) number is also a member of s." Pasigraphically: s **ℰ** Cls . O **ℰ** s . a **ℰ** s. a, a + **ℰ** s).

Explanation.-- Every 0 (zero), every a (number), every a + (successor of a number) are, individually only singular instances of a universal law. With the consequence that from 0, a, a + (summative) one can extend (amplificative) to all other, yes all possible (infinite set) number values.

(5) "If a and b are numbers and the successor of a is identical with the successor of b, then a is identical with b.-- Pasigraphically : a, b **ℰ** No . a + = b +). a = b.

ETM--LOG259 .

(6) “Every number has a successor, which is non-identical with 0”.

Pasigraphic: a No). a + =/ 0 (“If a is a member of the class of numbers, then the successor of a differs from zero”).

(B). II.-- *Machining axiomata.*

The ‘relations’ (ETM--HARM 77) -- of the ‘operation’ type -- are called ‘sum’ and ‘product’ (multiplication). They are defined as follows.

Characters : + and x.

(1).1. If a is a number, then a + 0 = a.

Pasigraphically: a ***ℰ*** No). a + 0 = a (The fact that a is a number implies that “a + 0” is equal to a).

(1).2. If a and b are numbers, then the successor a + the successor of b is equal to the successor of a + b.

Pasigraphically: a, b ***ℰ*** No). a + (b +) = (a + b) +.

So much for summative axiomata.

(2).1. If a is a number, then a multiplied by 0 equals 0.

Pasigraphically: a ***ℰ*** No). a x 0 = 0.

(2).2. If a and b are numbers, then a multiplied by b + 1 equals (a x b) + a.

Pasigraphically : a, b ***ℰ*** No). a x (b + 1) = (a x b) + a.

So much for the multiplicative axiomata.

Note-Axiomatics.

Now reread ETM--LOG 229 (the lucky enumeration/classification) and ETM--HARM 159 (dialectics).

(1) Irreducible (= last elements) and

(2) complete (no gaps or omissions)! Peano applied this.

a.-- Peano defined the natural numbers from zero and up.

b.-- Do ye wish to ‘define’ (enter) the negative numbers axiomatically? Then modify axiom (6), above! Then say, e.g. -- with axiom (3) on successors -- “- 1 + = 0”, -- “- 2 + = 1”, etc..

If the content becomes richer, then the size becomes poorer and vice versa.

Bibl. s.: -- C.-I. Lewis, (1883/1964; philosopher and logi(sti)cus), *La logique et la méthode mathématique,* (Logic and mathematical method), in: Revue de métaphysique et de morale 29 (1922): 4 (oct./dec.), 458s. (L’ école italienne);

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

Conclusion.-- Axiom (3) concerning a and a + contains a procedure that is repeated time and again (one adds just 1). Thus one constructs each number from an initial situation (e.g. 0 (zero)). Axiom (4) about mathematical induction generalizes this process. Thus one constructs algorithmically.

In passing, reference should be made to e.g. Ph. Davis/ R. Hersch, *L'univers mathématique*, Paris, Gauthier - Villars, 1985 (// *The Mathematical Experience*, Boston, Birkhäuser, 1982), 170/176 (*Mathématiques algorithmiques et mathématiques 'dialectiques'*, -- where proposers, o.c., 171, say that the term 'dialectical' may as well read 'existential').

For example, in solving the equation "$x^2 = 2$". The Babylonians -- around -1700 -- already found an approximate solution: root 2 = 1.414 212 963 (in decimal terms;-- in their hexadecimal terms: 1, 24, 5, 10. Pythagoras of Samos (ETM 03) -- around -550 -- found that the solution, "rationally" speaking, did not exist: as a diagonal of the square, root 2 "exists," but as a fraction, root 2 does not "exist."-- According to theorists, the solution is possible "algorithmically," among other things.

3.c.-- Chomsky's model.

Noam Chomsky (1928/...) is, with Morris Halle, among others, from the sixties, the great founder of the generative-transformational "grammar" (a theory of language). Chomsky invokes R. Descartes.

Bibl. s.: A. Kraak/ W.G. Klooster, *Syntax*, Antwerp, 1968.-- Here is a sample.

a. Suppose we want to describe (define) a language - a sign system. In doing so, let us suppose that all its sentences consist of one or more a's, followed by the same number of b' s. Thus e.g.: ab, aabb, aaabbb, aaaabbbb, etc..

b. The construction of all such sentences can be denoted as a method by which all sequences -- 'sequences'-- of one or more a' s and the same number of b' s can be constructed.-- For this purpose it is necessary:

(a) a beginning symbol 'Z' (sentence, pronunciation) and
(b) two rules (lines), namely, "Z --> ab" and "Z --> a Z b".

'Prescriptions' ('instructions') are rules that allow what is to the left of the arrow to be replaced by what is to the right of it. In this way, one can 'rewrite' over and over again. Immediately it is clear that the signs 'a' and 'b' form the 'components' (constituent parts) of the statements,--a kind of alphabet of the language.

Application.

(1) Do we apply rule (1) to initial 'Z', then - replacing Z with ab - we get the sequence 'ab'.

To this sequence, neither rule applies: it is end product (the shortest pronunciation of conscious language).

(2) Applying precept (2), we obtain the sequence "a Z b" -- To such a sequence, both precepts apply.

a. Hegel (1) leads (by rewriting Z by ab) to "aabb". Which again is a final product, -- specifically: second shortest sentence in the language.

b. Rule (2) leads to "aaZbb". No end product, because both rule (1) and rule (2) apply to it. Cfr. o.c., 17.

A, linguistic algorithm.

Look at the method: initial situation (an initial sign); operation(s): rewriting rule applied; forming sequences of language elements (from a collection here 'alphabet' -- of language signs; (eventual) a final product.

Something like that is what Chomsky calls an algorithm. And the construction of sequences he calls 'generating' - 'generating'. A theory of language, a 'grammar' or speech, cast in such an algorithmic form, he calls a 'generative grammar'. Since here only the configuration (the geometric form) of the symbols counts, such a speech art can be called 'formalized' (ETM--HARM 84: syntax; 94 ('formal systems)). The semantic or pragmatic content or objective does not count; only the syntactic arrangement.

3.d. Informational model.

Bibl. s.: W. Boogers/ J.-M. Gantois/ H. Olivié, *Start (Textbook of information science for secondary education*), Deurne, Novum, 1986.

We live, from along to more, in an informational society. Hence the increasing importance of some serious understanding of the computer, which is at the center of it.

a. A computer is a device ("machine") that "processes data; data, in a purposeful way (purposeful system; ETM--HARM 95). Immediately the computer, system learning theoretic, is analogous to the algorithm, as we saw ETM--LOG 254.

b. Imagine you want to get the alphabetically ordered list of the nine Belgian provinces from your 'personal computer'. Thanks to communication, i.e. the transmission of information, in the form of characters, you enter the names of the provinces (input, supply or input), -- possibly in random order.

Thanks to the 'program' (in French, "le logiciel"), your computer can 'produce' (output,-- output, issue) from it the alphabetically ordered list.

Sample 33.-- Comprehension (algorithmic thinking). (262/270)

By way of introduction.

Before we elaborate on the thinking type of the computer, a bibliographic ***sample.--I.***

-- E. van Spiegel et al, *The information society (The consequences of the micro-electronic revolution),* Maastricht/Brussels, 1983;

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

-- H. Christiaen, *Computers in the classroom? (Why, to what end, how?),* in: Strive 1985: May, 634/645;

-- J. Haers/ H. Jens, *Computer science and computers in education,* in: Streven 1984: July, 928/940;

-- E. De Corte/ L. Verschaffel, *Learning to program: vehicle for acquiring thinking skills?* , in: Our Alma Mater (Leuven) 1990: 1 (Feb.), 4/35 (with bibliography a.c., 33/34);

-- J. Ellul, *Le bluff technologique*, Paris, Hachette, 1988.

II.-- Related theories.

a. Decision theory.

-- G. Menges, ed., *Information, Inference, and Decision*, Dordrecht/ Boston, Reidel, 1974.

b. Game theory.

-- Janos von Neumann/ Oskar Morgenstern, *Theory of Games and Economic Behavior*, 1944;

-- David and Morton D. New York, *Game Theory (A Non-Technical Introduction),* Peninsula Publishing, Basic.

Risk Analysis.

-- K.S. Shrader-Frechette, *Risk Analysis and Scientific Method (Methodological and Ethical Problems with Evaluating Societal Hazards*), Dordrecht/ Boston, Reidel, 1985. So much for a few indications.

The computer system.

Two large sections.

(1) The actual computer,--with the keyboard (“keyboard”) in front.

(2) The background is peripherals.-- In this, the keyboard is ‘input machine’ and the ‘monitor’ (with e.g. the screen) and the ‘printer’ (with chain paper) are output machines.

Note -- The diskette is a disc on which countless ‘data’ (data, ‘information’ or intelligence as far as usable in the computer) are stored (the data carrier). Immediately we have the ‘memory’ (the disk as a storage of data).-- The diskette machine is both input - and output unit.

Conclusion: supply, memory, and output are the three “functions” (roles) of the diskette unit.

Equipment (hardware, matériel) and software (software, logiciel.

Two aspects define working - calculating - with the computer. --

a. Equipment (hardware, material).

This includes the totality of 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 information.

b. Software (software, logic).

This includes the entirety of the programs and, as well as, the associated documentation materials (think manuals, flowcharts for computer operation).

-- Ph. Davis/ R. Hersh, *L'univers mathématique*, (The mathematical universe,), Paris, 1985, 365/369 (*Modeles matéhmatiques, ordinateurs et platonisme*), (Mathematical models, computers and platonism), points out that real informatic 'arithmetic' (i.e. working with the computer) comprises both aspects: if one expects "the absolute truth" from a computer, then both equipment and software must be in perfect order. Which is far from always the case.

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

a: understanding the use of the equipment;

b1. understanding the core thinking process the algorithm;

b2. structuring the data (information) to be entered;

b3. applying to applicative models (concrete cases);

c. shielding the data from intruders).

A.-- the automatic washing machine as the model of the computer (original).

A.1.-- Model.

One is familiar with the automatic washing machine.

Its algorithm includes (a) the initial situation, (b) the set of "commands" (instructions, commands), (c) leading to the final result.

In particular:

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

b. according to the nature of the laundry, an appropriate washing program (in the built-in microprocessor, a chip with logical structure and memory (a computer in miniature) present) is deployed (a button is pressed that selects one of many fixed washing programs); the machine performs the program; the waste and rinse water are drained;

c. the clean laundry is removed from the drum.

A.2. - Original

a. Similarity.

According to that model, the computer also works: input of data, processing according to a program, end result.

b. Difference.

1. The washing machine is highly pre-programmed.

2. The computer is much less pre-programmed; the user can - to a certain extent - build a program himself, i.e. 'program' a problem to be solved. -- Behold the analogy (i.e. partial similarity, partial difference) between a washing machine and an actual computer.

B.-- Programming.

We define: 'programming' is transforming the given and the requested (together called 'problem') into a logically correct sequence of elementary (irreducible) - for the type of computer used 'understandable' - steps. In other words: to form an algorithm.

It is the whole process that goes on,--from the moment we start thinking about the problem until the final program runs smoothly on the computer.--The pure translation work into the programming language is only a small part of this." (P. Heinckiens, *Programming is more than typing*, 69).

"Programming is done mainly on paper.

One does not jump right on the computer! One walks to the writing table, takes pen and paper. That too is already "programming. But this is done in its own way called "structured programming".

Conclusion.-- Outside of all computer science, one begins by simply thinking logically about the given and the asked, as has been done for centuries (a solid preliminary study). But this is with a view to computerization.

Problem/ algorithm/ program.

We explain this order as follows.

a. Problem. -- The data -- present in the data -- elicits the demand. One analyzes this.

b. Algorithmics. -- "Algorithmic thinking is the hard core of, computer science" (H. Haers/ H. Jans, *Computer Science and Computing in Education*, 933).

An algorithm -- we repeat -- is a definition (ETM -- LOG 215) in the form of a scenario (sequence), which fully encompasses the irreducible events (here: assignments).

Reread what we said about enumeration/classification, -- ETM--LOG 229 (complete /inheritable), 259 (lucky axiomatics): a lucky algorithm includes all elements just once. -- The summative induction - ETM--LOG 236 - applies to it.

c. Translation into a computer language. -- A program records what the 'programmer' wants the machine to perform. It is, therefore, a series of 'commands' (instructions, commands).

These are translated into some programming language - elan, pascal, logo - that the computer "understands" (for which it is suited).

C.-- The algorithm.

The 'top-down' method on algorithm applies the Cartesian method (ETM--HARM 189;-- ETM--LOG 254; 244 (stechiotic method)): the totality--all/whole--is broken down into irreducible (smallest) elements and immediately formulated so that a conclusive set of unambiguous commands--from a starting situation--leads to the final result.

Note.-- The opposite of "top down" is "bottom up.

Structures: repetition, sequence, preference.

The concept of structure was clarified ETM--HARM 90 (// 117, 211, 228, 238, 251).

a.-- Iterative algorithm.

The monotonous repetition of the same thing! Model: a, a, a, a, ... The task is simply repeated a number of times. Think of the Negro-African model, ETM--LOG 243 (all days right one stick).

Appl. model. One wants to extract a list of twenty names from a computer's inventory: one presses "enter a name" twenty times.

b.-- Sequential algorithm.

Here's a non-eventful sequence.-- Model: first a, then b, onward c, then d, etc.-- Think magic and culinary models, ETM--LOG 255.

Appl. model. Making 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..

c.-- Selective algorithms.

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

Appl. model.-- Pension calculation in computer.-- Does entitled person belong to a category (worker, employee, self-employed, etc.), yes or no (if yes (model), then ...? Has the beneficiary had a full or incomplete career, yes or no? (if yes, then ...). E.d.m..

Up to there a word about the algorithmic types.

Note.-- ETM 06 we saw that the Ancient Greeks are "the cradle."

This remains, for the umpteenth time, when we recall that Herodotos (ETM--HARM 135v.v.) was already "programming.

In the Herodotean method of text formation, we note two aspects:

a. 'Historiè', inquisitio, investigation.

This produces the unformed substance, the materials, i.e. the 'data' (information, intelligence). In ancient rhetoric (= theory concerning the composition of texts) this is called 'heuresis', inventio, invention.

Herodotus cites the data either from his own observation (which he trusts the most) or on the basis of "hearsay" (eyewitnesses, stories).--This is how the "programming" should be done even today.

b. 'Logos', textus, text.

This is the formed substance, insofar as it went through two transformations.

i. 'Diataxis' (also: 'cabs'), dispositio, arrangement.

This is structured arrangement of text parts (the plan of the exposition is one main part of it).

ii. 'Lexis', elocutio, design (stylization).

This is the planed formulation of what one has to say ("the message"). This is how the programmer still does it today: he/she arranges, preferably in the form of an algorithm, the data; he/she gives it a style. The big difference with Herodotos lies in the translation into a programming language.

Cfr. G. Daniels, *Religious-historical study of Herodotus*, Antwerp/ Nijmegen, 1946, 100.

Note.-- One has tried to demonstrate the formative value of e.g. ancient Greek (or Latin), in more than one way. Also that of computer programming. Both stand or fall with the theory of order (harmology), logic and the theory of methodology, insofar as these are addressed in Greek, Latin or computer work. In this sense, ancient rhetoric is and remains a very valid introduction to computer thinking. By what means? Because rhetoric, if properly understood, is the teaching concerning programming. A Herodotos had understood that well.

D.-- Thinking skills questions.

'Programming' an Antique text, 'programming' an algorithm via computer,-- both require thinking skills,-- logic and applied logic. We will address these briefly.

D.1.-- The thinking skill type.

According to E. De Corte/ L.Verschaffel, *Learning to Program*, 12/14, programming is governed by three premises, concerning expert problem solving.

A.1.-- Basic insights.

Stellers call this "domain-specific knowledge", i.e. having the necessary and sufficient information about a 'domain'. For example: anyone who wants to solve a legal issue (e.g. a divorce) via computer should be well informed legally (the 'domain'),-- especially regarding basic insights (legal concepts, legal Conclusions, -- methods in court cases).

A.2.-- Order, logic, method theory.

The authors call this 'heuristics'. Method in searching for solutions they call 'search strategy'.

E.g., the top-down method (breaking down totality into parts), employing diagrams, taking an analogous problem as a model (ETM--LOG 263v, where to explain the computer we used a "model" (the washing machine)), thoroughly teasing out one aspect, etc...

Note.-- One can even notice a phaseology ("fasis," in ancient Greek, means "the appearance of a heavenly body"; a series of phases).

1.1. On the basis of the given and the requested, it comes, through analysis, to an understanding of both ("One grasps the meaning of the given and the problem").

1.2. A lemma, i.e., a provisional solution, comes to mind ("One begins to see ready").

2.1. Elaboration of that lemma ("The algorithm gets off the ground").

2.2. Review ("evaluation") of the solution thus worked out ("One forms a value judgment").

Appl. model.-- The construction of a dwelling.

1. The builder in virtue of pondering forms a sketchy picture.

2. He appeals to a structural engineer (a. An initial rough sketch (rooms, basements, storage areas, etc.); b. A detailed elaboration follows).

3. The contractor works out.

b.-- *introspection. (self-knowledge).*

Cfr. ETM-HARM 145.—The authors speak of 'metacognition;-- 'Cognition' means 'knowledge' (data + structure). 'Metacognition' means "knowledge of knowledge" (looping, reflexive knowledge, i.e., knowledge that knows itself (ETM--HARM 77)). "Am I, who program, indeed a reality-based ('objectively set') logical person? Or am I proceeding 'irrationally'? Do I have preconceptions? How far does my memory reach? How far does my inductive power reach?" Etc.

In other words: where do I stand regarding problem solving?

D.2.-- The thinking skills limits.

Amidst a number of computer drunks, a number of people remain sober! For example, Prof Weizenbaum (M.I.T. (Massachusetts Institute of Technology)).

Fact: at a number of American universities, every student must have a micro-computer.

Response from Weizenbaum.

1. Not everyone in the USA agrees. For example, the physics department of M.I.T. has refused the strong expansion of computer facilities for students. Reason: to strongly prevent that one looks at the study material exclusively from the question: "What can be programmed about this?". M.a.: to avoid one-sidedness.

2. A great deal can be taught very well without a computer. In particular: the teaching material does not have to be adapted to the computer;-- but the computer is used - preferably where it is superior - as a tool alongside other teaching methods. Cfr H. Christiaen, *Computers in the classroom*, 645.

Denise Jeanmonod, *Le bluff technologique*, (The technological bluff), in: Journal de Genève 18.03. 1988, in a commentary on Ellul's *Le bluff technologique*, says: "One has to think in terms of algorithms, i.e. a set of unambiguous commands.

But when one is so completely molded in that way of thinking, one is totally closed to any other form of thinking: Ellul calls this "computer terrorism" that penetrates even the unconscious and subconscious layers of the soul.

Again: warning against the isolation of the mind!

General Conclusion.

Algorithmic programming is

(i) one possible actualization of an ancient method, which we already saw at work in the magical-mythic stage,

(ii) but it should be aware of its limits

Note.-- Bibl. st.: Cedos, *Cerveau humain*: "*Maman, enco un miscui*", (Human brain: "Mom, one more cookie"), in Journal de Genève 10.12.1990.

Fact.-- **(1)** A two-year-old baby recognizes in an instant a cookie that narrowly shows its edge in the packet.

(2) The most powerful computer of the classical type failed to do so.

As an aside, this fact proves that the baby in question is a living being gifted with mind,-- mind, which needs only a minimum of perceptual data to recognize anything. Which the classical computer is not: it is and remains at best a machine model of the original which is the baby's mind.

Response.

a. A new type of ordinators

Since 1960+, especially since 1985+, information scientists (USA, Japan, Switzerland) have been experimenting with a new type of ordinators, namely neuron networks. A classical computer contains a program (microprocessors); a neuron network does not.

b. Original.

The human brain contains about a hundred billion neurons (a "neuron" is a nerve cell with its neurite and dendrites), which interact with each other, thanks in part to the astrocytes.

Model.

That paragon attempts to approximate (simulate, i.e. mimic) the neuron network. The network does not contain a program, but rather a set of elements - artificial neurons - that interact with each other of an electrical nature. And this with a sensitivity threshold susceptible to change.

Appl. model.

Supposedly, one gives such a network a command (instruction, 'command') "Find the word 'cookie' in a text". To this the network responds somewhat like a human: the more a word is similar to the word 'cookie' it is looking for, the more it becomes electrically 'excited'.

conclusion: The algorithm, specific to the classical ordinator type, is transparent. The algorithm in the neuron network, however, appears to the specialists, involved in this research work (electronicists, neurobiologists, psychologists), as eccentric!

Note.-- This implies that, ETM--LOG 263 (software), the definition of computer should be partially revised intake whether or not it is provided with a program. Also concerning programming itself (ETM--LOG 264).

As an aside, neuron networks are suited to key phenomena of robotics (the Czech 'robot' means 'artificial man', -- broadening to include labor machine), namely (i) artificial vision and (ii) word processing.

E.-- Transfer.

Can the ordinator thinking method be transferred to other "domains" (from one domain-specific sphere to another) or not?

Bibl. st.: B.L. Feringa/ R.M. Kellogg, *Decomposing into factors* (Nobel Prize in Chemistry 1990), in: Natuur en techniek (Natural science and technology monthly magazine) (Maastricht/ Meise) 58 (1990): 12 (December, 832/839.

The organic chemist Elias J. Corey, called "the most prolific organic chemist in the world" by colleagues, received the Nobel Prize in part for his "retrosynthesis.

‘Retrosynthesis’ is a chemical method that allows for the creation of a complex molecule **(i)** from simple building blocks **(ii)** in a very efficient manner.

But - and here is the reason why we dwell on it - this method is so “logical” (in the sense to be determined later) that it is applicable in computer programs. As a result, organic chemists are using the computer in the search for the most appropriate, prescription for a molecule sought.

As an aside, please reread ETM -HARM 145 (combinatorics). Creating molecules is a type of configuration formation.

a. -- Synthesis.

Corey, with about twenty collaborators, worked on the formation of gibberellic acid (a structurally very complex plant hormone) from simple elements (often compounds with carbon atoms). This provides an opportunity to manipulate biological traits.

b.-- Retor synthesis.

Corey broadened the synthesis method.

a. Complicated structures he methodically decomposed into the smaller building blocks (cf. ETM--LOG 265 (top down)).

b. With such compounds, Corey then works in the opposite direction (bottom up): he resynthesizes.

Here Corey involved the computer, namely the type LHASA (Logical Heuristics Applied to Synthetic Analysis), frequently used in university and industrial laboratories around the world (think drug research).

From 1959+ Corey at Harvard University has been very active with that. Precisely that computer logic on synthesis was (one of the main reasons for his 1990 Nobel Prize.

Total synthesis.

The creation of natural substances, starting from simple molecular components, is called ‘total synthesis’. ‘Natural substance’ is an organic compound of natural origin. The different atoms from which a hormone or an antibiotic is ‘combined’; -- their mutual interactions, the functional groups within them, the spatial structures,-- all this comes into play. Step by step (algorithm) one decomposes into ‘synthones’ (final building blocks). This is retrosynthesis.

Appl. model.

Corey thus synthesized the ginkgolide-B, a complex compound found in the Ginkgo biloba (Japanese walnut tree), used in Chinese phytotherapy against asthma and inflammation. This was done in thirty-seven ‘steps’. Algorithmic!

Sample 34.-- Theory of understanding (individuology, I). (271/273)

By way of introduction.

Now reread ETM 30 for a moment: among the categorical notions, we distinguished, among other things, condensed (singular, individual) notions. Immediately we also distinguished an idiographic theory of concepts.

See also ETM--HARM 190 (Schleiermacher's "divinatory" (immediately containing "understanding") method),-- ETM--LOG 211 (introspective approach to singular representations).

Individuology (idiography).

This is the description, resp. explanation of all that is singular, individual, unified,-- more so: of all that is single, unique in the strict sense.

Nearby is the "study of all that is rare, i.e., of what occurs in (very) small numbers. Yet the study of the rare belongs to the study of the general which is invariably where more than one copy of the same thing occurs.

The proper name.

Linguistically, one could speak of "proper nomenclature. Opposite the species name, after all, is the proper name that names the individual.

The proper name names the singular, indeed unique form of being (ETM 31), i.e., that by which the singular or the only one makes itself distinct from the rest,--not only from the species (such as the merely singular) but even from being (the totality of all that exists (such as the only one)).

Textuological types.

That individuology exists is shown, among other things, by the literary "genres" (types).

Thus, in Antique rhetoric, prosopography is the representation in text of a person, resp. a personality.

Thus, in the same rhetoric, topography is the representation in a text of a landscape.

Although both descriptions contain general data about someone or about a landscape, the fascinating thing lies in their individual characteristics.

Further: in historiography, there is the biography or life description, which, amidst universal data, is mostly overflowing with individual information.

More generally, a monograph is a treatise on a single part of a subject science or also of one particular fact (so e.g. a fact, a person, a region).

Conclusion.-- Already from what precedes, it is clear that individuology (idiography) exists.

Note.-- The individual in memory loss.

Henri Bergson (1859, 1941; French spiritualist philosopher), in his *Matière et mémoire (Essai sur les relations du corps à l' esprit)* (Matter and memory (Essay on the relationship between the body and the mind)), (1896) pointed out that memory loss is an ordered process. The proper names are forgotten first, then the generic names. Then the quality words weaken. Finally, one forgets the verbs, which express imitable acts.

This implies that speech classification is more than a pure language-sound affair (phonology): it is as if the singular concept is the top of a memory pyramid.-- This also says something about those people -- often scholars -- who are particularly comfortable with the general, with the singular in parentheses.

The exceptional (rare) is not the one-off.

Bibl. s.: -- F.C. Bartlett, *Exercises in Logic*, London, 1913.

W. Stanley Jevons (1835/1882), an English logistician, provides an eight-class enumeration.

a.1.-- *Imagined exceptions.*

The merely asserted or even merely imagined (fictitious) exceptions or rarities. These are "entia rationis," as the Scholasticians, in the Middle Ages, said, i.e., "thought things" without verifiability beyond assertion or imagination.

a.2.-- *The apparent exceptions.*

What at first glance seems 'exceptional', turns out, upon closer examination, to agree with e.g. the laws of nature and "confirms the general rule".

b.1.a.-- *The truly exceptional data.*

There are facts, e.g., in the natural sciences which, because of their exceptional character, force those sciences to revise or, at least, to adjust their assumptions (hypotheses), sometimes to a profound degree.

b.1.b.-- *Jevons distinguishes exceptions:*

a. accidental exceptions, which are the result of a confluence of circumstances;

b. non-normal exceptions, which by scale or deviation require a hitherto unknown 'paradigm' (model of thought), although they leave the more general laws untouched (think of monsters, i.e. highly deviated individuals);

c. genuinely new and as yet unexplained exceptions that call for the introduction of new laws (think of the deviation of light rays in the vicinity of a celestial body, which prompted Einstein, among others, to put forward the concept of curved space).

Around a material body there is - among other things due to gravity or manifesting itself in gravity - a kind of force field that causes a ray of light to deviate from its straight path (or, paradoxically, curves that straight path); at first this was 'inexplicable' (because the premises of physics of the time were not sufficient));

d. ***Limiting (limiting) exceptions:***
The application domain of a known law turns out to be less general than a more general law;

e. ***Really rare exceptions;***
notable yes, one-offs, yet which are not inconsistent with the general law of nature.

Appl. Model
Bibl. s.: *Science et Vie*, (Science and Life), 731 (1978: août).

The halobate (sea shanty).
At least one marine insect exists! -- The combined weight of the insects, spread over the earth, is estimated to be twelve times the weight of humanity,-- suggesting the magnitude of the insect phenomenon in a model.

"Where there are about 800,000 species of insects, there is just one that has adapted to the habitat that is the sea" (a.c.).

Indeed: sailors have found the halobate hundreds of kilometers from the coast: they see a miniature skater (it reminds one of Gezelle's '*Schrijverke'*), gliding over the sea waves,--at about two to three kilometers per hour. Quite a bit faster than his freshwater counterparts.

The reason the halobate is not seen on the mainland is because it is unwinged. It lives on plankton, small fish and even jellyfish that it sucks out from somewhere. It lays its eggs on all that floats: a bunch of seaweed, the skeleton of a dead creature.

As an aside, Lanna Cheng, an entomologist (insect scientist) at Scripps Institution of Oceanography in La Jolla, California, "dug in" a few years ago to find out why this rare - indeed, so far, only - adaptation to the marine environment was possible.

Conclusion. - Stanley Jevons' classes of exceptions are understandable on the background of the natural science belief inherent in the XIXth century, which postulated rock-hard natural laws, signs of a "no exceptions tolerant" law. With that belief as a background, "exceptions" therefore come into strong focus.

Sample 35.-- Theory of understanding (individuology, II). (274/285)

By way of introduction,-- Just now we have described and vaguely compared the one-time (sole, unique, singular) with the exceptional and, immediately, the rare.-- Let us now consider the definition.

The definition of the (professional) scientific 'undefinable'.

A well-defined (professional) scientific tradition, in the West, holds that the one-time as a one-time (i.e., in its one-timeness) is not definable.

So the Middle Ages Scholastics, of a certain stripe: "Individuum ineffabile" ("What is individual is ineffable").

P. Ch. Lahr, *Logique*, 537, quotes: "Non datur scientia de individuo. (There is no (professional) science (possible) concerning the individual").

The argument.

How does one attempt to justify that statement?

1. Synchronous.

Real things are always somewhere, however minute, different and/or separate.

Appl. model.

Suppose two at first glance totally identical cubes. Yet they differ,-- simply because they are and distinct and separate. In particular: the geometric form is identical, but the ontological (being) form is non-identical (ETM 31).

The physical and chemical substance (matter) of which they are composed is not the same. If they were the same, then they, natural and chemical, would coincide and, under that point of view, would be indistinguishable (and thus exhibit not two but one and the same form of being (physicochemical).

In ontological language: both cubes are 'analogous' (partly identical partly non-identical);-But that implies that they are different and to put them under one and the same definition means to think away the differences and the separations. This is: to think away a part of reality. What is called 'abstracting'. Only in abstracto are they one; i.e. identical.

2. Diachronic.

Both cubes, whether they are in wood or stone or metal or whatever, change (think e.g. of metal fatigue). "If something is incessantly changing, then it cannot possibly be known scientifically. For, while one studies it thus, it becomes something different from what it was a moment ago."

Thus a statement attributed to Platon's teacher Kratulos.

A definition that does not include that change in its articulation thinks away a part of reality. Which, again, is the work of "abstracting. Only in abstracto are things unchangeable.

Conclusion.-- A definition that does not define whole and all something commits a mutilation of reality. A classical definition amounts to an approximate, yes, crude scheme. Nothing more.

But there is define and define.

The Romantics, the German in particular, pointed out that and science, and definition of a concept are possible in more than one way.-- What we are now expounding.

The School of Coimbra.

Bibl. s.: O. Willmann, *Gesch. des Idealismus*, III (*Der Idealismus der Neuzeit*), Braunschweig, 1907-2, 112/115.

Willmann talks there about the aristotelianizing Jesuits,--in the Portuguese port city of Coimbra, the "Conimbricenses. One of their works: In universam dialecticam Aristotelis (1605).

Therein all that is singular is defined as follows: "Id cuius omnes simul proprietates alteri convenire non possunt". (That whose properties (kentraws), taken collectively - and indeed all properties - cannot be peculiar to all that is different).

In other words, all traits of knowledge, insofar as they constitute an indivisible unity, cannot possibly be those of something else.

This amounts to distinctiveness in a very thoroughgoing sense,-- to a form of being that is irreducible, as a totality at least, to anything else.

Now reread ETM--HARM 238 (summative induction), and you will see that a well-defined type of summative induction underlies the definition of the Conimbricenses. One speaks and of all traits of knowledge and of all summed up then!

Which means both collection and system. Well, there is certainly more than one way of 'defining' the way in which the one and the same constitutes both a collection and a system, although this will have to be done in its own way.-- What we are now outlining.

A textbook example. (275/7277)

A well-prepared school teacher enters the classroom with ... two "cubes" (which her students are not supposed to know yet). The children look on curiously. This is a first encounter not with a definition, but with the actual cubes.

Once the lesson has begun, it turns out that one is made of wood and is bright blue and the other is made of aluminum.-- The students ‘see’ this. This is an acquaintance or ‘encounter’ ETM -HARM 78 (Buytendijk), -- 136 (Dilthey). But with the difference that, in the case of the singular, it is not just about persons and groups or about cultures, but e.g. about objects like cubes. it is the direct contact with the real ‘singularia’ (singular things), as our Middle Ages predecessors said.

What happens next? The teacher shows both cubes, one after the other. While each time she says, “This is a cube”.

The ostensive (aka: deictic) definition.

For now, she doesn’t say much more about it. But the definition of the cube is in there! How so? ‘Ostendere’, in Latin, means ‘to show’: The ostensive definition is the showing definition.

1. Henceforth, the children know, relatively accurately, what “a cube” is.

Reread ETM--LOG 229 (the traits of a lucky definition):

a. the children have ‘shown’ all aspects of the cube:

b. the children have ‘shown observed’ all aspects’ just once (as a creature form, that is) in two different copies of them.

2. Henceforth, all children in the class have ‘shown’ all aspects of the wooden - bright blue and the aluminum cube. They know which is one and which is the other, taken singularly. They have a ‘definition-via-tones’ in their cups.

The term ‘ostensive’ is metonymic: it expresses only part of the content of the concept. For actually the schoolmistress’ mode of definition - visual education - is both ostensive (‘showing’) and characterizing (‘characteristic’). And existence - existence (ETM 33) - and being - essence - of and the cube-in-the-general (abstract) and the singular cubes is made clear to the children.

Conclusion.

They feature:

1. two specimens (phenomena),

2. a vague but real concept (definition),-- both embodied in the name ‘cube(s)’ (term(s)).

Cf. ETM--LOG 225 (name/content and scope).

Generalization.-- Imagine this: a number of Japanese industrialists want to acquire the most accurate understanding possible of, say, the port of Antwerp.

Doing what? Simple: the ostensive-characterizing method (peculiar to contemplative teaching, which is and contemplation (= direct confrontation, encounter, acquaintance) and explanation (= characterization, characterization))! For, as we saw ETM--HARM 128, as well as ETM--LOG 225, 228, without the ostensive aspect ("beholding") the characteristic ("explanation") is empty. -- Without the explanation, the contemplation is blind. It is invariably the same systechy that works.

An attendant shows the Japanese businessmen around, for example for a whole summer afternoon, and explains everything, as much as possible, if necessary with all kinds of numerical materials.

Conclusion.-- Those businessmen will leave Antwerp with an ostensible "definition" in their heads that respects the one-time nature of the port.

In addition to the field, of geography, which shows a strong one-time bias, there is that of history ("history").

Imagine: a lesson on the Old Belgians. Showing what can be called "the testimonies" (historical documentation), and explaining - always ostensively characterizing - the teacher will teach a definition that respects the one-off, inherent to the Old Belgians.

Conclusion.-- Both geographically and historically, it is clear: the world in which we live is full of singular realities, which, although 'inexpressible' (in a purely abstract sense: are nevertheless 'definable' in a demonstrative-explanatory way. The 'definition' then sticks in the terms of the explanation.

Terms, which, if need be, can be summarized in e.g. some lapidary (summarizing the main points) statement, the subject of which is e.g. "the port of Antwerp" or "the Old Belgians" and the saying a set of terms which are all collectively only expressible of their subjects. Which is the definition of a "definition"--as we saw ETM--LOG 215.

The singular-situative definition (277/279).
One also says, since the Romantics especially, "singularly-concrete

Explanation: 1. 'singular' is singular; 2. 'situative' is "all that concerns the situation in which that singular is situated"; 'concrete' (from Latin 'concrescera', intertwine, ingrow), i.e., "what pays attention to the situative aspect".

Cfr. ETM--HARM 125 (dichotomy), 129 (figure (foreground)/background).

Indeed: the inward and outward comparison (ETM--HARM 131; 185 (comparative method, in general);-- 191 (divinatory-comparative method (Schleiermacher)) is in place here.

Appl. mod.

1. The two cubes, (ETM--LOG 275) situate:

a. in the general concept of the cube (metaphorically: ETM 24 (metaphorical synecdoche)),

b. in the teaching materials of the teacher (metonymic: ETM 24 (metonymic synecdoche)).

2a. The port of Antwerp is situated:

a. in the general concept of "port" (metaphorically),

b. in the complex of Belgium/ France/ Netherlands -- North Sea -- British Isles,-- with rival ports such as Dunkirk, London, Rotterdam (metonymically).

2b. The Old Belgians situate:

a. in the general concept of "Ancient Peoples" (metaphorically),

b. in the complex "Germania/ Gaul" (metonymic).

Conclusion.-- The ostensive-characterizing method of defining is to be enriched by the singular-situative (singular-concrete) method which situates in the general and in the collective (cf. ETM--HARM 90 (distributive and collective structure). Immediately, individuology becomes a confrontation with the singular and inward and outward.

Note.-- Now reread ETM--HARM 131v. (Augustinian social criticism); 132vv. (Grossian principle): they are applications.

Appl. model.

The definitional complex of the Conimbricenses (ETM--LOG 275).-- The texts bequeathed to us by the Jesuits of Coimbra contain a method which is appropriate here. To define something in its singularity -- in, the stricter sense than above -- they have formulated, in a distich (two-line verse), a mnemonic means. = "forma (creature form),-- figura (Gestalt, material view), locus (place), stirps (descent), nomen (name, designation), patria (native region, homeland, habitation), tempus (time(dot)) = unum (the one-time thing) perpetua reddere lege solent (invariably give the one-time thing)! Behold the rule;

Now a little application.

(A) forma (creature form): woman.

(B) 1. figure (view): very beautiful, 2. proper name: Roxana. 3. origin: daughter of Oxuartes, satrap of the Persian monarch, the "basileus" (as the Ancient Greeks, said),

4. region of birth: Baktrianè, part of the then Persian Empire (+/- Turkestan/ Iran/ Afghanistan), 5. place: central Asia (present-day Turkestan, Iran and northern Afghanistan), 6. time(dot): -327 Roxana marries Alexander III, the Great (-456/-323; the founder of a Macedonian-Eastern empire, source of "Hellenistic" culture,-- -319 she leaves for Epeiros (Lat.: Epirus) to Alexander's mother, Olumpias,--316 she is imprisoned by Kas(s)andros (Lat.: Cassander), king of Macedonia (Macedonia, in northern Greece) -354/-297,-- in -310 she is murdered by him.

A definition must be exclusive and general (ETM--LOG 215). It is clear that the network of kentraws--not one or more kentraws individually--, peculiar to the method of the Conimbricenses, do define Roxana and only Roxana and this singularly-situative (singularly-concrete). Roxana is viewed and shown/characterized internally and externally.

The incomplete yet sufficient listing.

Now reread what we said about the enumeration, ETM--LOG 229,-- 254 (algorithm): it consists of irreducible elements whose number should be complete. Certainly in computer processing, if it is to be absolutely reliable. But real things are not all of the same nature as an ordinator operation! One must learn to make do with:

1. Incomplete listing,

2. Which is nevertheless adequate (sufficient),.

What St. Thomas Aquinas (1225/1274; top figure of Scholasticism (800/ 1450), -- inspirer of Vatican thought, still today) expresses as follows: "huiusmodi formis aggregatis" (thanks to the aggregation (= enumeration) of such 'formae', partial traits).

Collective induction.

'Induction' is: a. taking (including haphazard) samples, b. such that one can generalize.

Well, this can be done in two ways:

a. metaphorically (what is commonly called 'induction': from the specimen to the rule (= collection),

b. metonymic (which is inducing from one or more parts (aspects) to the whole (= system). Cfr. ETM--LOG 245 ('compositio logica'/ 'compositio physica'),- ETM--HARM 90 (distributive/ collective structure), 97 (all/ whole).--

Appl. model.--Remember Roxana's example. 1. Not all kentraws were listed (incompleteness). 2. Nevertheless, they are adequate (sufficient: I.e.: one takes samples until when the one-time feature is secured.

The indirect method (280/285).

As Herodotos of Halikarnassos says (ETM--HARM 135), there is a two-pronged approach:

1. 'autopsia', the direct beholding of the data (which in Herodotos' case amounts to what he himself (aut.-) saw (-opsia));

2. 'marturion', testimony (law others claim). The testimony is no longer. Toning - characterizing, but indirect, i.e. through something else. The 'mediate' is, after all, opposed to the immediate.

The semiotic approach.

ETM--HARM 98vv. (Sign(symbol) and model) taught us, ETM--HARM 103, the distinction between the metaphor of a map (image, likeness) and the metonymy of the signpost (reference, coherence). Between ionizing and indicative (indicative) sign.-- What can be reached only indirectly, must necessarily be approached through signs (symbols). All that is synchronical, too distant, all that is diachronical too distant, is covered by that approach through signs, metaphorical (depicting) and metonymical (referring).

Conclusion.-- The mediate method is an application of the theory of signs.

The black-box method.

One may know what "the black box" in electricity is: a switch box that one does not open ("black", because inaccessible), but from which wires leave and into which wires enter ("not-quite-black", partially accessible. Cfr ETM--HARM 136 (what goes on in the fellow); ETM--LOG 218 (lemmatic analytic method).

Note.-- Indeed: all induction starts from a global but vague notion ('lemma') that is clarified thanks to decomposition (further sampling essentially) ('analysis'). The 'black box' is the reality to be clarified by induction and the global-vague understanding of it.

The convergence method.

'Convergere' (Lat.) is "to run together; 'to run together', to go in the same direction". What the demonstrative-explanatory method is regarding immediate individuology, the convergent method is regarding indirect approach.

Bibl. s.: -- H. Pinard de la Boullaye, S.J., *L' étude comparée des religions, II (Ses méthodes)*, (The comparative study of religions, II (Its methods)), Paris, 1929-31, 509/554 (*La démonstration par convergence d'indices probables*); (The demonstration by convergence of probable indice).

-- J.H. Newman, *Grammar of Assent*, London, 1895.

The detection method.

The indirect method is:

(i) a black box method (one recognizes only (very) partially that which one seeks to define),

(ii) a. a lemmatic-analytic method (one assumes an (as good as) unknown, with which one works (‘analyzes’),

(ii) b. a semiotic or sign theoretic method (one relies on signs, ‘traces’, that either resemble or refer to the sought).

Appl. model.-- One knows Sir Conan Doyle (1859/1930; Scottish novelist, known for his Adventures of Sherlock Holmes (1891/1925), This Sherlock Holmes is an enthusiast policeman, who is brilliant at ‘tracing’ (finding and pointing out traces), at the unravelling of the crime (as Doyle himself says in Death and Return of Sherlock Holmes, Amsterdam, Contact, 1973-2, 9).

As an aside: pretty much all police and crime novels and ditto films have an analogous structure: they

(i) notice (observation, direct contact) traces, i.e. phenomena, directly experienced,

(ii) but which they interpret (interpret, interpret) as signs of something else, which is invisible, namely the cause of a crime, the ‘black box’ of the story.

But note: a multitude of separately non-evidential signs shows, in the succeeding case, a convergence, a pointing in the same direction (of the culprit). Only together do they obtain a defining evidential value, viz. they define the causal factors of the wrongdoing.-- That is the convergence method.

Note.-- None other than S. Freud (ETM 55/57) says of the psychoanalyst that he is, metaphorically, “a Sherlock Holmes”: in finding (perception) and interpreting (interpretation as signs) the unconscious and subconscious factors -- e.g., an Oedipus complex -- the analyst resembles a detective.

Umberto Eco’s semiotics.

U. Eco (1932/2015), Univ. Bologna professor (in semiotics), is world-renowned for his filmed novel The Name of the Rose, Amsterdam, 1985-10 (Il nome della rose, Milano,1980),

As he says in his Postscript to The Name of the Rose, Amsterdam, B. Bakker, 1984, “I needed a detective (...) who would

a. possessed a great powers of observation (note: perception and

b. an extraordinary sense of interpreting clues (op.: interpretation)” (o.c.,36). Indeed: in his The Name of the Rose, 35v., he says, in the course of the story itself: ‘(...) But ... when you ‘read’ the tracks in the snow and on the branches, you did not yet know Brunello.

In a way, those tracks that could be 'read' in the snow and on the branches speak of Brunello, even if he was still an unknown. In a certain sense those tracks speak to us of all horses or, at least, of all horses of that kind". (...).-- "Not quite, dear Adson" replied my master. (...). The trail at that place and at that hour of the day told me that of all the possible horses at least one had passed by there. So that I found myself halfway between acquiring the concept of a horse and the knowledge of an individual horse. (...).

i. If you see something from afar and cannot determine what it is, you will be content to describe it as "a body of a' certain size.

ii. When it has come closer, you will describe it as "an animal" even though you do not yet know whether it is a horse or a donkey.

iii. Finally, if it is even closer, you will be able to say that it is "a horse" even if you don't know yet whether it is Brunello or Favello.

iv. And only when you are at the right distance will you see that it is "Brunello. (...). That will be the full knowledge, the intuition of the individual". (o.c., 35v.).

Conclusion.-- Eco as Nominalist or, in a current version of Nominalism, Postmodernist, strongly emphasizes idiography,--as the "complete knowledge".

Note -- Cumulative structure.

We have deliberately marked the cited text with numerical letters to indicate that the convergence method

(i) includes a sequence (order, sequence),

(ii) which plays an accumulating ('cumulative') role: the knowledge of the individual becomes clearer from along. The lemma, unclear concept, becomes, in the progressing analysis, a clear concept.

Opm.-- Phenomenal/Rational.

Now reread ETM 17vv.-- There we saw that research

(i) begins with the phenomena, the immediately given,

(ii) but can push through, rationally, to the (as yet) ungiven, which, through the sign, may be hinting at.

Says, to the point, Arthur Conan Doyle, *Death and Return of Sherlock Holmes*, 8: "Again and again, in the most varied cases - fraud, theft, murder - I have 'detected' the presence of this power. And with regard to crimes which remain unexplained (...) I have often been able to conclude, by the way of reasoning, of that presence".

Note --- The statements.

What gives the convergence method the necessary evidential value?

a. It is, as we saw, an inductive method, with its uncertainties.

b.1. J. Bernouilli, *Ars coniectandi,* Basel, 1713, calls it "a high probability" (ETM 46),--with a negligible risk of being mistaken" (which is analogous to probability theory). So not an absolute certainty.

b.2. Kard. Newman, *Grammar of Assent*, viii, 2, 320, says: Newton's lemma, Principia, is modeled. "It is known that a regular polygon, drawn in a circle, if one multiplies its sides indefinitely, gradually grows into a circle. (...) . Similarly, concerning singular things, the Conclusion is foreseen and predicted rather than actually reached. Which is analogous with the concept of limit (limit).

b.3. Kard. Newman, *Grammar of Assent*, ii, viii, 2 (Informal inference), gives another explanation. "If I am not mistaken, one finds truths acquired in this way in all domains of knowing the one-time. "That supralogical judgment," which arouses our sense of certainty, does not spring from mere common sense, but it is a healthy act of our reasoning faculty,--an act more subtle (more elusive), more profound than the mere appraisal of a well-formulated argument

Which points in the direction of Schleiermacher's 'divinatory capacity'(ETM--HARM 1901)). Now 'divinatio' in Latin, is the term that designates mantism (ETM 242). If this is true, then there is a transrational element at work (cfr. ETM 18),--perhaps in or, at least, beside the rational transgression of the immediately given 'trace' (sign).

The mode of induction, characteristic of the convergence method, seems to us to exhibit the characteristics of all the theories about it cited above. They should therefore be seen as inclusive, not exclusive.

To express the latter, the transrational, one can use the language of the Differentialists (ETM--HARM 196): "The last reason or ground of a convergence certainty invariably differs from that which is merely obtainable by logical reasoning; that reason/ground escapes all logical analysis sensu stricto for a long time." Which makes Newman speak of supralogical basis of certainty-within-a-constant-uncertainty.

Notorious applicative model.

Bibl. s.: L. Elliott, *Piratage informatique : la longue traque*,(Hacking: the long hun), in: Readers Digest (Sélection) (Zurich) 42 (1990): 6 (juin), 180/208.

Note.-- We classify the account of this article, in terms of 'dramaturgy' (stagecraft). Reference should be made to ETM-- HARM 154 (qualitative jumps in a process or event),-- also ETM-HARM 117 (theory of tension): an event is a process with tensions and phases. (jumps). - The theme: detecting (searching/finding something singular via 'traces') computer pirates.

1.-- Front knot.

The Introduction.-- Cliff Stoll, once a Sixties Hippie, astronomer, is the author of The Cuckoo's Egg.-- Employed at the Lawrence Berkeley Laboratory since August 1986, he soon learns from Dave Cleveland, a college graduate, that a discrepancy -- a 75-cent deficit -- had been identified in the accounts.

2.-- Knot.

The plot. -- "Solve that, genius. No one understands any of it" says D. Cleveland.

With this assignment, the dramatic action sets in.

a. About a dozen bulky computer units were used by more than a thousand professional scientists and university graduates (mostly physicists). Each user had an account that was kept by the ordinators themselves. They noted down, to within a second, the time and drew up the invoice.

b. In that 'haystack' there was at least "a needle" (one or more pirates) at work. Just one 'sign': the 75 cents shortage. That 'trail' put Stoll on the road to the pirate(s).

Stoll studies the workings of the entire accounting system. Because only then could he actually begin. First, he checked that there were no errors in the lab's computerized file cards.

Then he examined the list of users, among other things, by comparing it with the invoices. Until he could situate the deficit: a certain Hunter, not listed on the list of invoices, had used the ordinators to the value of 75 cents,--just the time to get into the "system. No one had paid. Conclusion: a second 'sign'.

3.-- Twists.

The peripeties.-- A first twist: one Monday morning, an ordinator from Maryland (Dockmaster) reported that "someone" from the Lawrence Berkeley lab had attempted to penetrate his "data" (ETM--LOG 266) over the weekend.

Shock: Dockmaster belonged to the U. S. A.'s Center for Informational Security (in Baltimore). Whereupon Stoll again absconded with the files: a single account holder, one Joe Sventek, had used the ordinator at 8:30 a.m. on Saturday morning.

Note.-- Followed by a whole series of twists and turns -- from 1986 to 1989. At one point, Stoll wanted to give up. But, except for a wife and especially Luis Alvarez, 1968 Nobel Prize winner in physics, who advised him to work scientifically, Stoll was "driven" to continue.

4.-- Denouement.

The Expiry.-- This was found, not without the cooperation of the West German police, 11,000 KM. from Stoll,-- including in Hanover. A Chaos Computer Club (CCC) was at work, among other things. So Markus Hess, programmer, member of the CCC,-- Hans Hilbner, programmer and member of the CCC,-- Karl Koch, anarchist, drug user but still programmer, Dirk Brzezinski, drug user, sports car fanatic, violent but still programmer,-- Peter Carl, former casino croupier, driver of Brzinski. They worked, in full period of 'perestroi-ka' (restructuring) and 'glasnost' (openness) of the Soviet Union, for a KGB - er contacted since September 1986 in East Berlin looking for (mainly) the military secrets of the USA. For ...money. This led, 15.02.1990, to a trial of M. Hess, D. Brzezinski and. P. Carl.

Note -- Cultural history note.

Please reread ETM--HARM 121vv. (conflictuology: including youth between fifteen and twenty-five,-- including a lot of "Alternatives" and "Postmoderns").

The Soviet Union, notwithstanding its rapprochement with the Liberal (and, among other things, Capitalist) West, continued with the mole work, -- apparently surprising, in this regard, are the very light punishments of the pirates, among other reasons, for a not or not sufficiently existing legislation in West Germany. Where, after all, the offenses seem to be very serious.

Conclusion.-- Notice the structure (ETM--HARM 90):

a. initially, with the data too limited, Stoll can go just about any direction (= divergent initial phase; divergent phase);

b. over time, thanks to increase in data, everything points in precisely one direction (convergent phase; convergent phase.

Sample 36.-- Theory of concepts (individuology, iii). (286/290)

Dwell, now, on some samples taken from rhetoric, philosophy, and the professional sciences.

I.-- Rhetoric. 'Rhetoric', in the traditional sense, is the study of (i) the text (semiotic aspect) (ii) as a sign of understanding (signific aspect).

One sample.-- ***Bibl. s.:*** Roland Barthes, *L'aventure semiologique*, (The semiological adventure,), Paris, 1985, -- 115 (John of Salisbury),-- 14: vv. (Quaestio).

John of Salisbury (1110/1180). He introduces a duality.

a. 'Hypothesis' is, in traditional rhetoric, all that is singular-concrete,-- i.e., something that includes its singular circumstances (= situation) (who?, what?,-- when? where?,-- how?, what?, how?, how?/why?, etc.), while 'thesis', in that rhetorical language context, means all that is general.

b. According to John of Salisbury, rhetoric studies the hupothesis, the singular case, while dialectics studies the thesis, the general law. Literature is rhetorical, philosophy dialectical.

Appl. model.

1. Should one, in conscience, marry? Stated so generally, that question belongs to the domain of thesis (dialectica),-- in Middle Ages Latin: positio, propositum.

2. Should Klaartje marry? Put in this singular way, the question belongs to the domain of hypothesis (rhetoric),-- in Latin: causa, a situation, a 'case'.

Note.-- One can see that John's language differs from the more general language regarding 'thesis' and 'hupothesis'. It is reminiscent of the term 'chambers of rhetoric' ('chambers of rhetoric') that dealt with literature.

Note.-- The Scholastic (800/1450),-- the age in which John lives--has, philosophically, an analogous distinction,-- in the wake of Aristotle. Yes, of Platon. The Scholastic epistemology (science theory) distinguishes two things.

a. Scientia', science.-- It studies, like the Platonic theoria (ETM--LOG 223: scientific insight), the actually provable, singular fact ('phenomenon'), but with a view to its general features: "Scientia est universalium".

Note.-- Logic is partly an exception it studies the general concept,--next to the singular concept.

b. 'Scientia practica', practical knowledge.

Our action concerns the singular, 'singularia'. "Singularia in quibus est operatio" says S.Thomas Aquinas, *Summa theologica iii*, 11: 4 ("The singular data to which action is directed").

Note.-- Francis Suarez (1548/1617), the main figure of the Spanish Scholastics (1450/ 1640), after Aristotle and Plotinos of Lukopolis (203/269; top figure of Late Antique Neo-Platonism) the greatest metaphysician ("ontologist" in the traditional sense), claims that our understanding of the singular possesses an immediate and well-defined intuition (direct knowledge, "contemplation").

Bibl. s.: O. Willmann, *Gesch. d. Idealismus, II (Idealismus der Kirchenvater und Realismus der Scholastiker)*, (Idealism of the Church Fathers and Realism of the Scholastics), Braunschw., 1907-2, 402/420 (Die Wissenschafts-lehre der Scholastiker).

Note.-- Heinrich Rickert (1863/1936), known for his Kulturwissenschaft und Naturwissenschaft (Tübingen, 1899) written in Neo-Kantian spirit, distinguishes:

(a) traditional logic, since the Eleates (Parmenides, Zenon), which allows the study of the general and
(b) the "new logic" (as he calls it), which makes possible the study of the singular.-- Which connects to German Romanticism.

Bibl. s.: G. Barraclough, *Scientific Method and the Work of the Historian*, in: Proceedings of the 1960 International Congress, Stanford; University Press, 1962.

It should be noted that Rickert allows only singular data in the science of history: to speak of "historical laws" is, for him, nonsense.-- Which, of course, is open to criticism.

Carlo Ginsburg, *Detour as Method (Essays on Hidden History, Art, and Social Memory),* Nijmegen, SUN, 1988, distinguishes, also, in a famous article, between "sciences of the general" (Hempel-Oppenheimer type) and "sciences of the singular" (the healing arts,-- diagnostics,-- the science of history).

II. *Logic (mathematics).*
Bibl. st.: -- J.-Cl. Piquet, *La connaissance de l'individuel et la logique du réalisme*, (The knowledge of the individual and the logic of realism), Neuchâtel, 1975;
-- D. Vernant, *Introduction A la philosophie de la logique*, Bruxelles, 1986, 80/85 (L' élimination des termes singuliers);
-- K. Bertels/ D. Nauta, *Introduction to the model concept*, (Introduction to the philosophy of logic,), Bussum, 1969 (o.m.93).--

Bertels/ Nauta distinguished:

a. the concept of an individual - called "constant" (unchanging) - and

b. the concept of a random individual - called a "variable" (changeable).

In the abstract language of logistics, resp. mathematics, 'a' denotes a single individual value, while 'x' denotes any individual, i.e. 'a', 'b', 'c', etc.

Both concepts are apparently complementary (mutually definable).

The logical resp. Logistic-mathematical definition.

Bibl. st.: V.W. Quine, *Philosophie de la logique*, Paris, 1975, 43 (// Philosophy of Logic, Prentice Hall, 1970).

Vernant cites, o.c., 81.

(1) The singular term 'Socrates' e.g. can be replaced by 'singular description'. An example: "The teacher of Platon. Or: "The Athenian thinker who drank the poison cup". Reread ETM--LOG 278: the Conimbricenses were, on that point, perhaps further along! Quine defines as they do, through matter-of-fact details.

(2) The same singular proper name 'Socrates' e.g. can also, yes, be better replaced by an artificial proverb. This is a verb form with formalizing intentions.

Appl. models.

a. 'Socrates' is replaceable by "the object that socratizes".

Note **-- 1**. In common parlance, "socratize" means "to think along the lines of Socrates. **2**. In Quine's language, it means "to be like Socrates alone."

b. "Socrates is wise" can be rewritten by "There exists an x precisely such that x

i / 'socrates' and

ii/ wise is". Quine calls such a thing "verbalization of the grammatical proper name". 'Socratizing' in such language is then a 'formal' (understand: 'formalizing') and thus general term that is valid only for precisely an object, the actual, historically traceable Socrates.

Conclusion.-- Thus Quine law founds one called "the logical proper name".

Remark.-- If one pushes this method of defining, it leads unerringly to an "inflation" (exaggerated increase) of verbs. Imagine: "Napoleon is the object that napoleonizes"; "Quine is the object that quinizes"; "Buytendijk is the object that buytendijkizes", etc..

Peter Aureolus (+1322), with his economy principle would perhaps say "The terms should not be needlessly multiplied."

III.-- *Biology.*

Bibl. s.: -- S. Erkman, Biology*: l'Invasion des empreintes génétiques*, (the DNA Invasion), in: Journal de Genève 13.10.1990;

-- Fr. Vandenbussche, *Genetic profile helps identify criminals*, in: De Nieuwe Gids 27.02.1991.

By way of introduction,-- the extreme-Structuralists claimed, a few years back, that "the subject" (understand: the self-conscious individual) was merely "foam" on the waves of "the structures" that were posited as all-controlling,-- that determined our supposedly conscious lives through unconscious and subconscious mechanisms. Meanwhile, that fad has already cooled. But what follows reinforces that chilling.

a.-- Erkman.

Two hundred and thirty specialists from some thirty countries participated, in Bern, during the month of October, in the first International Conference on Genetic Printing.

Applications: just about anything,-- fighting cancer, protecting elephants in Africa, selecting apples.-- To the cradle: the Brit Jeffries who, in 1985, developed that technique.

Restriction enzymes.

An enzyme is a catalyst (playing an intermediate role e.g. in food, digestive processes).-- The technique designed by Jeffries is an application of the general decomposition of the ADN (DNZ) - deoxyribonucleic acid - (a technique that got off the ground in the late seventies). Hundreds of enzymes, of bacteriological origin -- actually "cutting enzymes" -- cut (= the English "restriction") the ADN (DNZ) into pieces.

"Restriction Fragment Length Polymorphisms".

The tests show that the pieces of hereditary patrimony are highly varied in number and size, with each individual (excluding identical twins) exhibiting precisely a well-defined unique ADN (DNZ).

Application.

A few thousandths of a milliliter of blood and/ or semen, a drop of saliva, the root of a hair, a piece of skin suffice to identify the individual as an individual.

b.-- Vandenbussche.

Each cell of our body (which consists of many billions of cells) contains, in principle, all the traits that are specific to each of us. Test tubes and microscopes do the rest: scientists can extract from such a cell a complete genetic passport, which, moreover, can be read.

1. The widely known fingerprint.

As a method of identification, it is checkmate by, e.g., criminals wearing gloves.

2.1. The genetic "fingerprint".

Since 1985, it has been exposed by cell biologists. It is reminiscent of the bar codes that computers use in department stores to identify goods and prices.

2.2. The genetic profile.

At the Center for Human Heredity at KUL, the method was refined (Polymerase Chain Repeat or PCR).-- Prof Cassiman limits himself to a piece of "human bar code. All chromosomes, after all, consist of a number of parts repeated several times. The number of repeats ('marks') is characteristic of each individual -- it is enough to map the 'marks'.

Result.-- "A swab from the vagina of a raped woman" (sic) containing e.g. semen can serve as evidence for a crime. -- More to the point: almost flawlessly, the identity of the perpetrator can be determined,...if only a comparison sample -- e.g., blood -- is available.

IV,-- Linguistics.

Bibl. s.: *Speaker-independent speech recognition outgrows its infancy*, in: The Financial-Economic Times 27.11. 1990.

A.-- The idiolect.

No two living beings pronounce the same word in exactly the same way. Every language user, in other words, possesses a unique speech which makes him/her distinguishable from all other speakers: his/her idiolect.

B.-- The idiolect-independent computer.

Our mind recognizes, usually, immediately a general term in the idiolect of a fellow human being. The computer does not.

"Speaker-independent computers" nl, are speech recognition computers: they:

(i) understand any one who speaks and

(ii) can answer if necessary. One can therefore, in principle have a conversation with such a computer.

Now, the thing is that the computer only 'understands' unambiguous (never analogue, i.e. partly equal partly unequal) sounds. So what can be done to make it 'understand' analogous sounds? Each word (= general term) is repeatedly pronounced by a large number (if necessary a thousand) of speakers and thus recorded in the computer. If a word is spoken again, later on, he compares it with the vocabulary piled up in his memory.-- In this way he learns to 'understand' general terms through idioms.

Sample 37.-- Judgmental doctrine (propositional doctrine), (291/297)

Recall for a moment ETM 65/68, where the essentials concerning judgment (proposition, statement, sentence) have already been said.-- What we add here is a refinement of the insight expressed above.

Bibl. s.:

-- Ch. Lahr, *Logique*, 502/509 (La proposition);

-- W.C. Salmon, *Logic*, Englewood Cliffs, N.J., Prentice-Hall, 1963, 97/101 (*Analytic, synthetic and contradictory statements*);

-- G. Jacoby, *Die Ansprüche der Logistiker auf die Logik und ihre Geschichtschreibung*, (Logisticians' claims on logic and its historiography,), Stuttgart, 1962, 55/61 (Prädikaten- und Aussagenlogistik).

The concept of a compound sentence

Ch. Lahr, *Logique* 506.-- In Scholastic Tradition.

(1) "Propositio aperte composite": a sentence in which the plural of subjects and/or sayings is clear;-- e.g., "The dress and the jewels of that beauty are splendid and at the same time a tad eroticizing. -- that is a sentence that is 'aperte', explicit, 'composita', composed.

(2) "Propositio occulte composita": a (full) sentence that is imperceptibly - occultly - composed; -- e.g., "Only God is perfectly trustworthy".-- Such a sentence the Scholastics call 'exponibilis', the sentence can be understood in its full meaning. Here, "God is perfectly reliable" and "All other beings are not perfectly reliable". Thus, one uncovers the full meaning of that sentence.

Appl. model.-- Some statements are extremely "composite" and thus to be "read" (interpreted) with great caution.

Bibl. st.: *The meditating manager (Transcendental Meditation*), in: Business Magazine 2 (1990) : 5 (Nov.), 14.

The author, in that article, talks about 'mysterious' forces, which can help the businessman, end of XXth century: "The paranormal is only a modest part, a tool, which is fully integrated (op.: processed, incorporated) into normal management theories"

Leave out, for once, all the colored-in words - except the term 'normal' - : one still has the main meaning, but the emphasis on the very, very subordinate has fallen away. - Leave out, apart from those terms, 'normal' : one already distorts the sentence.

Note.-- Now reread ETM 68 (Quality): the "compound" sentences usually contain "restrictions" (caveats). They shift gears, nuance what would otherwise be said too brutally, too unsubtly.

Metaphoric and metonymic judgments.

ETM 66 (Identity) already taught us that a judgment expresses either a total identity ("a is a", "what I said, I said") or an analogy (partial identity).

In both cases, the judgment is model-theoretic (ETM 67): of the original, as far as unknown, expressed in the subject, the model, as far as known (informative), expressed in the saying, says something (= information, truth concerning the original).-- This in virtue of total or partial identity.

Tropological distinction.

ETM 20/27 (tropology) taught us that the concept of being(de) has two main variants: as an auxiliary verb, it expresses either similarity (metaphorically) or coherence (metonymically). Its preposition is a structure.

ETM--HARM 90 taught us that there is a distributive structure (all elements exhibit the same property (trait) and a collective structure (whole the element consists of a number of related traits). Cfr. ETM--HARM 97.

Indeed:

(1) a map provides information (truth) about a landscape based on similarity;

(2) a signpost also provides information about that same landscape, but in terms of coherence.-- The judgments that fit this exhibit either a metaphorical model or a metonymic model.

1. "This is Antwerp", -- while showing a city plan. The map provides information (is model) in that it resembles in its distribution of parts the distribution of parts of the city (the original).

2. "Look! There at last is a signpost, with 'Antwerp' written on it," while driving by in the car. The signpost provides information (is also a model, but different) because, planted in the right way (place), it indicates the right direction, -- whereby the signpost is not similar to Antwerp, but related to Antwerp: it belongs to the whole system that is the landscape, of which Antwerp is a part (subsystem) (the original).

Conclusion.-- The ways in which the proverb is expelled from the subject differ among themselves: a difference of structure is the premise of it. Nevertheless, everything remains within the ontological basis, i.e., the whole or partial identity of subject and predicate. What the logicians, in their criticisms of traditional logic, seem to forget.

Meaningful judgments and judgments that one interprets oneself (292/293)

The theory of judgment, in Aristoles' system, is called "theory of meaning" (Peri hermeneias, De interpretatione). With reason: whatever is real, however it may be, in the mind (a thought, a night dream, a work of science fiction) or outside it (extra-mental reality), has already been "processed" in a judgment about it.-- But there is "processing" and "processing.

Appl. model.

1. "That dress is beautiful", -- By this a lady may say that she feels the dress in itself ("kath'heauto", secundum seipsum,-- to speak with Parmenides of Elea) to be 'beautiful'.

2. "That dress is beautiful", - With this a gentleman can say - express - that he finds the woman, with the allure of a mannequin, 'beautiful', but expressed metonymically: what he senses of the woman, he transfers to her dress,-- whereby that dress does not interest him at all. It is not the dress per se, but his very own reaction of mind that is 'objectified' (expressed in seemingly objective language) in that sentence.-- Now reread ETM--HARM 109v. (coherence model).

Conclusion.-- Utterance 1 is "sense-grasping " (the lady grasps the sense of the dress, which is in itself beautiful),-- utterance 2 is "sense-making" (the gentleman "projects" into the dress what, at least in his sensing, the dress does not possess, i.e., "beauty").

Both, the lady and the gentleman, "give sense" but the former "grasps sense", the latter "establishes sense". Regarding this second, the German speakers have a good term "hineininterpretieren" (to interpret in such a way that one puts what is not in there... anyway).

Rhetorical model.

Bibl. st.: R. Barthes, *L'aventure semiologique*, Paris, Seuil, 1985, 126ss. (Preuves dans la technè/ preuves hors de la technè).

'Technè; Lat.: 'ars', in archaic Dutch 'art', is "all that testifies to finding something on it", skill (in the broadest sense; eventual: (professional) science.

When rhetoric, persuasion theory talks about "evidence" (in the broadest sense), it distinguishes between direct (direct) and indirect evidence.

(1) When the reader(s), the audience, finds something obvious (evident), the speaker/writer has direct evidence.

This is spoken in a sentence-grasping form: "(Everyone knows:) Iraq, in 1991, lost the war." This sentence establishes a fact.

(2) If, however, the person being written to or addressed does not find something obvious, then the writer/speaker has his/her own ingenuity - here especially reasoning ability - at his/her disposal to still "make it true."

E.g., "From the TV broadcasts (esp. CNN), from the newspapers here with us, if one thinks about it, it is clear that Saddam Hussein was a good people's agitator but not a solid military man.

Such a thing is not so immediately evident. But reasoning replaces the immediate evidence with an intermediate (indirect) evidence.

Conclusion.-- What the Antique Greek rhetoricians call 'pistis atechnos', proof without additional reasoning, is in fact an immediate - immediate – evidence, which one has only to articulate in simply establishing, meaningful sentences.

What they, however, call 'pistis entechnos', proof with additional reasoning, is in fact an indirect - mediate - evidentiality, articulable is reasoning, starting from determinations.

So that always - unless in delusion or deception language - immediate evidences (determination judgments) are the basis. Otherwise the writing/speaking is 'unreal' (ETM 60: the unreal man).

Or, to put it another way: the visual (intuitive) mind, which grasps reality immediately (sense-perception), and the reasoning (discursive) mind, which grasps reality moderately (sense-perception), are two aspects of the same knowing and thinking process. Cfr. ETM 65.-- Cfr. O.Willmann, *Abriss der Philosophie*, Wien, 1959-5, 19/28 (*Das Verstandesdenken/ das diskursive Denken*), (The reasoning/ the discursive thinking).

Note -- With Aristotle, an analogous distinction occurs:
1. 'logos apophantikost' is purely establishing judgment: 'She comes';
2. 'logos semantikos' is a more than merely establishing judgment. For example, a wish phrase. "I wish she would come." The determination is the fact that I wish she would come. "Go away, please!" The observation: I earnestly wish that thou wilt go away.

'Analytical' and 'synthetic' judgments (293/294)
I. Kant (1724/1804) attributed great value to this systechy.

a. 'Analytic' is a part if the conceptual content of the saying is already contained in that of the subject. E.g., "Two plus two is four"; "Every body contains extensiveness" (if one knows that to be corporeal is to be extensive, then the 'derivation' of the proverb from the subject is 'obvious' and almost immediately obvious).

Kantian: by means of mere ‘analysis’ of the conceptual content of the subject (original), one quickly sees that the conceptual content of the proverb (model) is contained in it. Disadvantage: one learns nothing. The pronunciation of the model (proverb) is not knowledge-expanding (‘amplifying’).

b. *‘Synthetic’* is a statement if the conceptual content of the saying is not possible through such a logical analysis of the subject.

For example, “Every body is subject to gravity.” One only knows this if one first does gravity experiments on bodies. But this judgment, although only indirectly evident, is knowledge-expanding, ‘amplifying’! New information is expressed in it.

All of this seems very “alien to life” (“abstract,” “merely theoretical”) and yet it is often decisive.

One example. -- Rudolf Carnap (1891/1970; founder, with Moritz Schlick among others, in 1924, of the Wiener Kreis, a Logical-Positivism (ETM 16: Reichenbach)), known for his *Der logische Aufbau der Welt* (The logical structure of the world), (1928), is, up to 1932 (and even thereafter), convinced that all information, i.e. all real knowledge (‘cognition’), is twofold: either analytical what he calls ‘linguistic’ (‘linguistic’ or logistic) - or synthetic - what he calls empirical and/or experimental.

Logic (borrowed from Wittgenstein and Russel and (formalized) mathematics - in the logicist spirit of Russell - consists of purely analytic judgments.

The firm, ‘positive’ sciences - especially the natural sciences (physics and chemistry e.g.) consist of ‘synthetic’ judgments, for which the detour of experience, preferably trial-and-error experience, is necessary.

He calls logistics and logistic mathematics ‘tautological (non-knowledge-expanding); the empirical sciences are, in his view, knowledge-expanding. There one learns - literally - something!

Note.-- The text types -- description, narrative (diachronic description),-- the report (report) -- are more likely to be couched in sentence to grasp the meaning, immediate evidential sentences. Other text types -- a treatise, for example -- exhibit a great deal of sentence-forming judgments.

Contradictory judgments. (295/297)

W.C. Salmon, *Logic*, 101f. (*Contraries and contradictions*), defines as follows: "For any statement p, p and -p (note: the negate, the negation, of p) are contradictory ('contradictory').

But there is more: we saw ETM 68 quality of judgments) that, besides affirmative and negative judgments, there are also restrictive judgments. Which we saw, in another way, ETM LOG 291 (compound sense), at work.

Derridism.

Bibl. s.:

-- S. Agacinski, *Derrida, Jacques* (1930/2004) in: D. Huisman, dir., *Dictionnaire des philosophes*, Paris, 1984, 711/ 717;

-- M. Lisse, *Le motif de le déconstruction, et ses portées politiques*, (The motif of deconstruction and its political implications), in: Journal of Philosophy 52 (1990): 2 (June), 230/250.

J. Derrida is a Postheideggerian: he translates what Heidegger, the fundamental-ontologist, calls 'Abbau' or 'Destruktion', by 'deconstruction'.

With Heidegger, now, it is first of all about the dismantling of the whole traditional ontology (ETM 26;-- 35;-- 53;-- ETM--HARM 196 (Differentism)), in that he is, in part because he is Nazi, and rejects Platonism as well as Christianity.

Derrida shifts the deconstruction: "In *L' écriture et le différence* (The writing and the difference), (1967) Derrida came out in favor of a kinship with dialectics that was his own" (according to Agacinski, a.c., 714). Cfr. ETM-HARM 158/161 (dialectics).

'Dialectics', here, sees the totality of 'being(s)' - reality - as a whole (collection/system) of synchronic and especially diachronic opposites.-- Well, these opposites are expressible either in contradictory judgments (p, -p) or in restrictive judgments (in some sense p, in some (other) sense -p). -- Let us take a Derridian example.

Derridian response to urgent problems.

In the course of an interview with a journalist from Le Monde (J. Derrida, *Entretien avec Le Monde*, Paris, Ed. La Découverte/ Le Monde), 1984), Derrida is confronted with urgent problems such as e.g. the Solidarnost uprising, in Poland,-- the Soviet war in Afghanistan, -- the political situations in Salvador, Chile, the Middle East, -- human rights in Turkey, -- the 'racist' (understand: communal) tensions in the EEC.

See here how Derrida responds to this with his very individual interpretation of dialectical reasoning - judging.

Before we, however, go into that, a note: now reread ETM--HARM 134 (analogy reasoning). The analogy plays in, Derridism a continuous leading role.

Suppose: the Gulf War (02.08.1990/ 01.03.1991). On 01.08.1990 this was an urgent problem: Saddam Hussein, quite simply, invades Kuwait and calls it "the nineteenth province of Iraq" (invoking a situation that predates the interference of the Westerners,--which is denied by experts).

Looking now at the sage, the paragon, the method (a word Derrida rejects, but one that does reflect reality with him), the "diminishing gesture.

(1) *Immediate response.*

In an immediate response -- urgent problems permit nothing else -- he would say, "In the name of justice in political relations, I am with the far-right -- here the Kuwaitis -- against the far-right,-- here "Une opposition simple et radicale" (a simple and radical position against).

Note.-- This Derrida does, like any ordinary person on this earth, from his own hypotheses (presuppositions; ETM 02: Platon's hypothetical method) at the time.

(2) *Medium response.*

Derrida's main concern, in, such situations, is not so much the accurate dissection of the facts as "not letting the advantage ('le bénéfice') be lost inherent, to that immediate reaction ("afin de ne pas perdre le bénéfice de cette prise de position"), (in order not to lose the benefit of this position).

What serves to do this? "Search for a 'place' (note: position, -- a term Derrida would reject, but which reflects reality with him), where the encapsulation ('recuperation') -- by the opponent, of course -- of the immediate reaction is no longer possible" ("rechercher des lieux où la récuperation d'une prise de position quelconque n'est plus possible"), (look for places where the recovery of any position is no longer possible).

Conclusion: at all costs prevent one from 'encapsulating' that first, immediate reaction, i.e. reinterpreting it and making it one's own in a new way.... In a continued - indirect - interpretation (judgment) or reaction one prevents an opponent from transforming the immediate reaction into the same judgment, but built into the opponent's context.

Applied here, "In the name of justice in political matters - said Saddam Hussein - I am with the disenfranchised - the Kuwaitis - against the disenfranchised - the political system of the rulers in Kuwait and the international, especially Western, complicity."

Note: One sees it: analogy “In the name of justice in political matters I am with those who suffered injustice against those who caused the injustice - ...-”. One fills in differently, but one retains the abstract form.

To be honest: a Derrida sees that very thing excellently. For centuries and centuries people, ordinary and the whole intelligentsia (the intellectuals, the artists), the whole vanguard, have judged like this. In schemata (ETM 37: categories), basic judgments.

With this difference that the Differentists (Derrida e.g.) try to make true that they do not do this (difference) and therefore think ‘differently’. a.o. to be ‘original’ (different from all others). And yet, on closer inspection, we discover one and the same basic scheme (‘commonality’).

M. Lisse, a.c., 247, quotes: a Micha Brumlik asks Derrida the question of ‘responsibility’ for Nazism and concentration camps. To which Derrida replies: “I am suspicious of the metaphysical concept of ‘responsibility’: although incorporated in the language of human rights (in the presuppositions of every democracy, - in Western ethics and politics), this ‘metaphysical’ concept of ‘responsibility’ has unfortunately not been able to prevent Nazism and Auschwitz”.

“Tres souvent, au contraire, le discours Nazi a utilisé l’ axiomatique qu’ on lui opposait. Non seulement les gouvernements ont laissé faire Hitler, mais les discours des intellectuels, les concepts théoriques issus de cette notion de responsabilité n’ont pas suffi à opposer un barrage suffisant au nazisme,-- mais, à l’opposé, un réseau de complicités de toutes sortes fut créé, -- ce qui nous donne aujourd’hui une si mauvaise conscience’“.

On the contrary, the Nazi discourse often used the axiomatics that were opposed to it. Not only did the governments let Hitler do it, but the speeches of the intellectuals, the theoretical concepts derived from this notion of responsibility were not enough to oppose Nazism, -- but, on the contrary, a network of complicities of all kinds was created, -- which gives us today such a bad conscience'.

Translated, as Derrida expects from the reader, “In the name of a responsibility (towards the miseries of the German people, in the 1920s and 1930s) I, Hitler, am for a National Socialist approach.”

“In the name of a responsibility (towards the same miseries of the German people, in the same twenties and thirties) I, Derrida, am for a non-National Socialist approach.” -- Behold “contradictory” judgments in Derridsa’s style.

Sample 38.-- reasoning theory, (the hypothetical sense). (299/303)

Basis: the compound sentence (ETM--LOG 291). This one harbors in it more than a singular sentence.

Basic form: "If ... then ..." (ETM--HARM 80v. (the embodiment).-- Well, reasoning in the strictly logical sense, is invariably an embodiment expressing thought.

Appl. model.

Bernhardt Bolzano (1781/1848; thinker who was intensely concerned with logic and mathematics), known for his *Wissenschaftslehre*, (Science teaching), 4 vols., 1837 (making him one of the founders of pure logic, along with George Boole (1815/1864)), conceives of judgment as an operation of the mind independent of the thinking subject (as a psychological being).

For Bolzano, logic and psychology are two thoroughly different things. Bolzano therefore studies judgment in itself, independent of the states of consciousness of our minds. Judgment is a "sense in itself" in his language.

Well, already St. Augustine (354/430; greatest church father of the West) reasoned pretty much as follows: "If 1 + 3, 3 + 1, 2 + 2, then (eternally, without anyone ever thinking it) 4." This then is the conditional or hypothetical sense in itself. In itself, 3 + 1, 1 + 3 or 2 + 2 are invariably 4. Without anyone ever articulating this in any language. In other words, if one considers, objectively, the relation between 3 + 1, 1 + 3, 2 + 2, on the one hand, and 4, on the other hand, it comprises an equality.

Note.-- the categorical sentence (proposition) unconditionally says something from something: "Four is e.g. 1 + 3". The hypothetical proposition says the same thing but conditionally: "If 1 + 3, 3 + 1, 2 + 2, then 4." -- Hypothetical sentences may include: "In that case (= if such occurs), then I will come".

Pre-sentence/ post-sentence.

Ch. Lahr, *Logique*, 509, defines the hypothetical sentence-and immediately reasoning-as follows: "The thinking operation that consists in it:

(i) from one or more prepositional phrases

(ii) a in a logical way (= as sentences in themselves)

(ii) b derive one or more after-phrases, is a reasoning"

One can see it: Lahr defines "reasoning" as seeing the logical connection between pre- and post-sentence, where the pre sentence necessarily expresses a condition,-- a premise, a hypothesis.

This is the core of all logic: to infer from hypotheses.

Note.-- Foundations research/fundationalism critique.

a. *'Basis'*

'Grounding' is another word for 'condition' (presupposed reality). The study of foundations deals with the presuppositions (thinking conditions, 'hypotheses' in Platonic language) of one or another science,-- e.g. mathematics. Or logic: traditional logic, as already mentioned, stands or falls on three 'hypotheses' ('elements'), namely, understanding, judgment and reasoning.

Classical geometry had as its 'foundations' the point, the line, the plane and the body. And without these 'foundations' they are incomprehensible. So: if foundations, then a science understandable, sensible, 'intelligiebel'.

b. *'Fundationalism'*

'Fundationalism' is the proposition that one has at one's disposal not only the happenings or even the ideal, but above all the necessary and sufficient conditions to make something truly and completely intelligible.

Practical: one claims to be able to "substantiate" (practically: provide the convincing evidence) all claims (judgments, propositions).-- Well, already Zenon of Elea (ETM 08) had figured it out: "neither thou nor I prove all things". Zenon is thus the first known fundationalism critic!

As an aside, since 1925, with G.E. Moore (1873/1958; Language Analysis thinker), A Defence of Common Sense, and since 1934 with Karl Popper (1902/1994; epistemologist*), Logik der Forschung*, (Logic of research), ... a very current fundationalism critique has been revived.

Even more: there are thinkers who consider every 'foundation' (every attempt at a foundation) to be pointless,--an impossible task. After all, if one utters a first sentence, one should first have to prove it,-- but from that prior proof one should then, in turn, provide a still more prior proof. And so endlessly reasoning backwards!

Note.-- This is, however, in itself, a mistake. By what? The human mind "founds" not only through reasoning, but first and foremost through direct contact (ETM-LOG 292: sense conception before or beside sense foundation) with reality.

In other words, there are prepositional phrases that express such a direct, immediate, perceived reality and, thus, no longer need to be proved indirectly.

Note.-- All of this is governed by an ontological (transcendental) principle (= basis, 'prevision'): "Everything has its necessary and sufficient reason (= ground, basis, condition of possibility either in itself or outside itself."

The principle of "sufficient reason" (this is what it is usually called) summarizes not only all actual (summative induction) but also all possible (amplificational induction; ETM-- LOG 236/241) "prepositions. It is the "hypothetical principle" par excellence, encompassing all possible presuppositions.

Note.-- Please reread ETM 69/71 (ontological theory of judgment): the principle of sufficient thinking and doing condition is a second type of comprehensive principle or proposition. Basis of all possible bases. Those who would deny it must appeal to it themselves!

Note.--

1. Now reread ETM--LOG 244v. (Platonic stechiotic method): the 'stoicheiosis' of Platon is of this ontological principle merely another formulation. After all, a 'stoicheion', elementum, element, is either internal or external.

2. Now reread ETM--HARM 131/134 (internal and external comparison).-- The internal and external comparison is only the method by which one finds the internal and external factors (elements). The necessary and especially sufficient "reason" (ground) is invariably a factor, i.e., something that makes something what it is,--an element of being. Or, in other words, a parameter, which appears in the formulation,--in the presupposition of that something.

Typology.

Bibl. s.:

-- W.N.A. Klever, *Dialectical thinking (On Plato, mathematics and the death penalty)*, Bussum, Wereldvenster, 1981, 43/48 (The State);

-- Alexius Meinong (1853/1927; member of the Austrian School*), Ueber Annahmen*, Leipzig, 1910-2;

-- N. Rescher, *Hypothetical Reasoning*, Amsterdam, 1964.

(1) ***Platonic.***

As Klever, o.c., 45, rightly and decisively says: "There are, then, according to Plato, two modes of thought, which have respectively a forward ('progressive') and a backward direction. The starting point is, in both cases, the 'hypothesis', (...)

(1) In (then) mathematics - in particular geometry - one would start from the presumption (...); one gives it (...) the honor of 'axiom' (op.: premise) and guide.

(2) In the (Platonic) dialectic, those hypotheses are merely stepping stones to be able to move more toward deeper 'principles' (op.: presuppositions) and from there to legitimize the initial hypotheses or to understand them as a moment (op.: a movable element) of them."

This complicated text becomes clear through an application.

(1) ***Forward hypothesis.***

Euclidean geometry posits, as ‘elements’ (factors, parameters): e.g. the point, the line, the plane, the body... As ‘axiomata’, purely presupposed elements (Cfr. ETM--LOG 257/260 (Peano), esp. 259 (axiomatics)).-- From there the geometrician reasons on, deductively, i.e. derivatively.-- Consequence: one therefore calls this method the “axiomatic-deductive method”.

(2) ***Backward hypothesis.***

To which Plato, as a philosopher-foundationalist (of mathematics at the time, among others), yes, as a fundationalism critic, responds, “Good! But what do point/ line/ plane/ body themselves presuppose in turn?”. Among other things: that they are a type of “being(s)”, reality. So the geometrician, unconsciously, presupposes being (and immediately ontology) as a ‘hypothesis’.

Counter model

Imagine that point/line/plane/body were not ‘real’ in the ontological sense, then the geometrician would be reasoning in ‘nothing’ (the rarefied, as one says); i.e.: he would not be (validly) reasoning!-- In other words, Platon examines the prepositions of the geometric prepositions.

Today this method is called the “reductive method.” It is the inverse, regressive axiomatics. It boils down to this:

a. given: something, e.g., a disease;

b. to that fact the sick person and certainly the doctor react according to the principle of sufficient reason or ground: “A fact always has its sufficient reason (hypothesis, element,-- in Platonic language) either in itself or outside itself”; so this disease has its explanation (other word for ‘hypothesis’) somewhere. Then the detective work begins.-- All experimental sciences work this way. All real ... Platonism works like this.

(2) ***Rescher.***

The prepositional phrase can contain different shades relative to the reality of something.

a. ***Problematic prepositional phrases.***

“Let us, against every (false) certainty about it, assume (Meinong: ‘Annahme’) that (it is not so).”

b. ***Paradoxical prepositions.***

“Let us assume, against a strongly established measurement, that (she is wrong).”

c. ***False prepositions.***

“Let us still assume, against the obvious truth, that (it is not true that ...)”.

Typology of afterthoughts.

Bibl. s.: Ch.S. Peirce, *Deduction, Induction, and Hypothesis*, in: Popular Science Monthly 13 (1878, 470/482.

Ch. S. Peirce (1839/1914; science thinker,-- founder of Pragmaticism (to be distinguished from Pragmatism)); ETM 12vv.) sheds a stark light on the types of afterthoughts in the aforementioned article.

We illustrate this using his famous "bean example.

a. Deduction (analytical).--- All the beans in this bag are. white. This handful of beans comes from this bag. This handful of beans is white.

b. Induction (synthetic).-- This handful of beans comes from this bag. This handful of beans is white. All the beans in this bag are white.

c. Hypothesis (= abduction) (synthetic).-- This handful of beans is white. All the beans in this bag are white. This handful of beans comes from this bag.

The deduction. Why does Peirce label the deduction (if all, then this handful (= some, at least one)) as 'analytic'? Reread ETM--LOG 293: the subject of the first sentence contains 'all'; it is immediately clear, by sheer conceptual decomposition of 'all' that 'at least one' or 'some' is already included in that subject.

However, ***the induction*** (if at least one or some, then all) is, apparently, synthetic: only empirical, resp. experimental testing can determine whether that reasoning is valid; for it may (eventually) be invalid. Reread ETM--LOG 236vv. (induction types): only the summative induction is certain; the amplificational one is not (ETM--LOG 239): the fact that a handful of beans, taken from a bag, is white does not prove that the unexamined beans in the bag are too!

The abduction (in Peirce's parlance the name for 'hypothesis') (if and all the beans in this bag are white and this handful white, then this handful from this bag) is, likewise, synthetic: it is not because all the beans in this bag are white and this handful also white, that this handful comes from this bag: perhaps (possibly) this handful comes from another bag! Only empirical, respectively experimental testing can give a definite answer to this.

Conclusion.-- The modalities (ETM 43 'necessary nasin' (deduction) and 'possible postphrase' (non-necessary postphrase) (induction and abduction) clearly show that a postphrase can result from prephrases in more than one way.

Sample 39.-- Reasoning theory (evidence/ argumentation/ argumentation (304/ 308)

Bibl. st.:

-- Ch. Perelman, *Rhetoric and argumentation*, Baarn, 1979;

-- F. van Eemeren/ R.Gootendorst/ T. Kruiger, *Argumentation theory*, Utr./ Antw. 1981-2;

-- The journal *Argumentation (An International Journal on Reasoning)*, Vol. 1: No. 1(1987), Dordrecht/ Hingham (Ma., USA).

Definition of the argument.

F. Van Eemeren et al, *Argumentation Theory*, 16, defines an argument (proof) as follows: "Argumentation is a social, intellectual, verbal activity, **1.** which serves to justify or disprove an opinion,

2. which consists of a constellation (op.: assembly) of statements and

3. those aimed at obtaining the consent of a reasonable judgmental public is directed".

Closer look:

(1) a set of statements (text),

(2) that involves an opinion (for or against),

(3) for the purpose of achieving assent from some audience.

Conclusion.

(a) Insofar as the audience is deemed "reasonably judgmental" (rationally minded), here is matter of logic. Which proposers affirm, o.c., 27, where they say that the basic structure of arguments (arguing, "proving") is the concluding statement (= syllogism) (about which more later).

(b) Insofar as, however, gaining consent is decisive, this is clearly rhetoric (persuasion).

Two/ Three Types of Arguments.

Bibl. s.: W. Klever, *Dialectical Thinking*, Bussum, 1981, 48/51 (Theaetetus).

(1).*'Rhetorical discourse'.*

Plato in his dialogue Theaitetos speaks of 'episteme', scientific knowledge; 'cognition' one would now say. The Protosophists (-450/-350), including Protagoras of Abdera (-480/4410; known for his 'thesis' that "things are as they appear to each of us") claim that 'knowledge' is "nothing but (sense) perception."

For one, the wind is "cold," while another finds that same wind "not so cold. To argue in a Protosophist context is to act, through reasoning of all kinds, on those impressions. Or rather to create such impressions in the audience. Even if all this is not so certain (probable prepositions lead to probable postpositions in the audience).

(2) a.-- *'Truthful argument'.*

"Alèthès doxa", the true, real-world opinion, is knowledge. "By means of the senses we arrive at knowledge which, however, is no longer of the senses." Thus Plato (184c). After all, the soul, as "spirit," grasps the essence, the precious reality, of things.-- By "interweaving" chunks of "true opinion" into a coherent whole, solid insight emerges.

An argument that proceeds from this shares in that soundness (true prepositions lead to true postpositions).

(2) b.-- *'Responsible truthful argument'.*

Opinions, based on sensory perceptions, yes! Opinions, supported on sense perceptions, but moreover true, even more yes! Opinions, supported on sense perceptions, but in addition and true and justified, many more yes!

What Platon, at the end, leads in to is the coherence of the argument ("interweaving") and to the presuppositions ("hypotheses"), which govern the argument.-- An argument that proceeds from this leads to insight into valuable reality (true and responsible presuppositions lead to true and responsible postpositions).

Note.-- Platon's student, Aristotle, divides as follows:

a. 'Rhetorical' reasoning departs from probable prepositions to equally probable postpositions;

b1. 'Dialectical' reasoning departs from 'probable' (in the sense of 'plausible', 'reasonable') prepositions to equally 'plausible postpositions'; this occurs, among other things, in scientific research, where a number of arguments argue for a proposition (judgment) without, however, providing absolute certainty;

b2. 'apodictic' reasoning departs from perfectly certain, radically sound, 'proven' prepositions to equally sound postpositions. These reasonings make up the core of every indisputable science.

Conclusion.-- Rhetorical and 'dialectical' reasoning have, fundamentally, uncertain prepositions. Only apodictic, irrefutable reasoning has certain prepositions.

From the point of view of logic, "rhetorical" and "dialectical" ("dialectical" in Aristotle's limited sense, of course) assertions are no more than mere "hypotheses.

General Conclusion.

The purely 'rhetorical' propositions and proofs are not treated here, in logic. They belong in a subject that has been 'in' again since Ch. Perelman (ETM 26v.: Neo-rhetoric), namely rhetoric.

The authority argument.

Let us apply what goes before to what the scholastics (800/1450) called "argumentum ex auctoritate."

Bibl. s.: W.C. Salmon, *Logic*, Englewood Cliffs, N.J. (USA), 1963, 63/67 (Argument from authority).

a. How often do we appeal to some authority. Reread ETM 12v. (Righteousness Method). A person (a movie star recommending soap; Einstein as a supporter of "relativism"), an institution (Amnesty International), a text (Journal de Genève as a magazine for businessmen, who demand solid information and not lyrical prose)! One of the most punitive forms was Nazism: "der Führer" (A. Hitler) thought and decided "fürs ganze Volk"! Or, in the former Soviet Union, the K.P.!

b. Now we dissect the value of the prepositional phrase in the authority argument. Formally, "X is a reliable 'authority' (usually expertise) concerning p (an opinion) AND x asserts p; therefore p is reliable, yes, true." If X is reliable in the matter and if X asserts p (his/her judgment) in the matter, then p is reliable;

The sentence "X is concerning p reliable" is not an analytic but a synthetic sentence (ETM--LOG 294): one knows this only if one tests it against reality. Well, usually the prepositional phrase comes down to this: "The great majority of the judgments, p, pronounced by x, concerning the specialty S, are true. Not all of them! Only some -- however many that may be.

Consequence: when X asserts something, p, the question is, "Does p belong to the true judgments or to the untrue judgments made by X?" The answer is possible only on an empirical-experimental basis. Thus, one must first examine whether the judgment, the preconception, is true or false. For that preconception may contain falsehood.

1. Appearance.

Some thinkers invoke A. Einstein, who championed the physical theory of relativity, to claim that even the high values of our Western tradition are "only relative." Now that's feigned: Einstein never proved the latter. He applies only in his specialty: physics.

We hardly speak of 'authority' here, supported on glamour (movie stars e.g.) - prestige, popularity (footballers advertising cologne: what do they know about it anyway?).

2. Undivided authority.

If other experts on the subject do not contradict, indeed, affirm, the assertion p, then the argument is all the stronger, of course. But always with reservations.

The "authority" of a professional science.

If there is anything that, especially since Modern Enlightened Rationalism (Galilei,-- Descartes, Locke 'has authority,' it is "all that calls itself science."-- Yet let us very briefly go into this: the sciences too--there are more than a thousand of them--are subject to the law of "if the prefaces then the postfaces.

Bibl. s.: G. Del Vecchio, *Droit et économie*, (Law and economics,), in: Bulletin Europe- en, 1962: janv.-fevr., 10/12.

Luigi Einaudi (1894/1961; economist; President of the Italian Republic (1948/ 1955)) argued that e.g. economics (state economics) is a hypothetical and partial science.

(1) Purely Platonic, this is very correct: the economist starts from premises. One can see this from the fact that Liberal economists start from a different global "hypothesis" than e.g. Socialist ones.

(2) But as a specialty, this is equally obvious.

(a) Economics as a discipline is partly 'value-free': only economic values apply (what is sometimes called the 'homo oeconomicus', man insofar as he only takes economic phenomena into account). Within that 'subject' (= domain, specialty), truly positive economics invariably holds.

(b) Then Einaudi says: "The economist as a professional scientist does not say to his fellow men: 'You should, ethically and politically, act like this or like this'. In that case he would be going beyond his domain, - where he is not an expert (authoritative): he would be doing ethics and/or politics.

"Well he says: if you act ethically and/ or politically in such and such a way, then - given the economic laws - your actions will have such and such economic consequences."

In other words: ethical, political rules of conduct are not given by the positive-scientific economist: but he does give clues as to the economic implications (consequences).

Appl. model.-- If a government allows a wage increase in one or more sectors, then this is a social measure (social justice),-- but then it is also an economic measure: the competitiveness of the firms that spend more wages may be reduced by it,-- the export possibilities may be affected. The economist will point that out.

Conclusion.-- All action, insofar as it is of spirit ("rational"), does well to think in "if-then sentences.

Quirkiness/preference among professional scientists.

A number of professional scientists want to convince both themselves of their individual presuppositions (= presuppositions) - method of individuality (ETM 12) - and others, in the conversations, resp. discussions, - of their 'beloved' presuppositions (= presuppositions) - method of preference (ETM 14). Their whole argument is controlled by this.

Appl. model.

Bibl. s.: Ch. Alain, *L'effet lunaire*, (The lunar effect,), n: Psychologies (Paris) 77 (1990: juin): 50/ 53.-- The little article talks about the influence of the moon, particularly the full moon, on a limited number of people.

It refers to individual assumptions and/or preferences of G. Galilei (1564/1642 founder of the exact, i.e. experimental and mathematical science of nature), cited by none other than G. Sarton, "the nestor of the history of science". Here is what Sarton writes: "Galileo wanted at all costs to eliminate astrology as a form of superstition. This led him to emphatically reject even the possibility that the moon exerts 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.

Is it true that so many are deluded by their 'irrational urges',-- urge for all that is 'mysterious', it is also true that Galileo's 'Rationalism' has prejudiced him,-- Something that is no better than superstition."

Note.-- The reasoning is clear:

1. if all forms of superstition - including astrology - should be opposed at all costs and

2. if one of these forms of superstition states that the moon influences the tides, then, among other things, this form of superstition must be entered into,--at all costs (to be understood: by not even investigating whether it is not true after all).

Note.-- Bibl. st.: R. Russell, trad./ ad., *Ce qu'il faut savoir sur végégetarisme*, (*Ce qu'il faut savoir sur végégetarisme*), in: Intuitions (Bruxelles) 5 (1989: Nov.-Dec.:29).-- "What does a professional scientific proof come to?

1. The scientist works in a lab.

2.1. His results reach his client and, immediately, are rarely available to the general public.

2.2. Moreover, they are often very different from the 'information' that is being shifted by our economic system that places 'return' above truth."

Sample 40.-- Reasoning theory (syllogistics/ close reading). (309/313)

And now -- what we have already employed several times -- something about the closing speech,-- ‘sullogismos’, Lat.: syllogismus.

Bibl. s.:

-- Ch. Lahr, *Logique*, Paris, 1933-27, 515/532 (La déduction mediate: le syllogism);

-- G. Jacoby, *Die Ansprilche der Logistiker auf die Logik und ihre Geschichtschreibung,* Stuttgart, 1962, 70/88 (Zu der logistischen Geschichtschreibung der anti-ken Logik,-- esp. 73);

-- W.C. Salmon, *Logic*, Englewood Cliffs, N.J., 1963, 37/47 (Categorical Syllogism);

-- Tae-Soo Lee, *Die griechische Tradition der aristotelischen Syllogistik in der Spätantike*, (The Greek Tradition of Aristotelian Syllogistics in Late Antiquity, Gottingen, 1984), Gottingen, 1984.

Behold a few specimens from a cluttered corpus of texts on the closing speech.

Definition.-- Derivation (‘deduction’ in the broad sense of ‘logical inference’) is mediate (‘mediate’) when it presupposes not a single but at least two prepositional phrases. The regular - well-formed - form of it is called ‘syllogism’ (concluding sentence).

Thus Lahr, o.c, 515.-- More accurately expressed, also with Lahr: “A reasoning consisting of three sentences,---so arranged (‘ordered’) that, from the first two sentences, the ‘premises’, the third, the ‘conclusion’ (inference, conclusion) follows.” Ibid., 515.

Central Role.

G. Jacoby, a connoisseur - par excellence - of the great tradition on the subject, writes: “Aristotle’s syllogism is the core piece never separable from any logic. It is therefore that on which theory of concepts (ETM--LOG 211/290) and theory of judgments (ETM--LOG 291/297) issue.

She involves that which is ‘logical’ (ETM--LOG 210: hypothetical sentence).-- She is the ‘reading off’ of identities (ETM 24: the identitive scope of ‘being(de)’) between

(1) in terms meant,

(2) actions expressed in judgments (‘Sachverhalten’), i.e. data.

Its dissection is main task of every logic.-- Therein exists the essential distinction between, on the one hand, logic, i.e. traditional-wisdom theory of thought, and, on the other, logics, i.e. calculative logic. Behold what Jacoby, o.c., 73, says very correctly.

Categorical and hypothetical syllogism.

First a few examples, First example.

Situation.-- A. Atwomiloto, a Catholic, editor-in-chief of the Indonesian weekly "Monitor," published a list of the fifty "most admired figures" in 1990, in which -- after President Suharto, Iraqi leader Saddam Hussein, and Atwomiloto himself -- the prophet Muhammad appeared only in eleventh place.

After an avalanche of protests -- in a country where of its 179,000,000 inhabitants 90% are Muslim -- Monitor was banned and its editor-in-chief imprisoned,-- accused by an Islamic court of

1. blasphemy of Allah, God, and

2. incitement to violence.

So says a series of magazines.

Syllogism.

In every situation, syllogisms are at work. Thus e.g.:

Categorically: "Islamic precepts (Qur'an, legal practice) are 'absolute' (not open to debate) and thus enforceable through courts of law; Well, Atwomiloto, in his, poll at Pop supporters, violates that 'absolute' character; thus he blasphemes Allah (blasphemy) and incites communal (racial and religious) violence),-- acts that, within an Islamic society are 'forbidden',-- immediately amenable to judicial intervention."

Hypothetical: "If Islamic precepts are 'absolute' and thus enforceable through courts of law, and if Atwomiloto violates that 'absolute' character in his poll of Pop supporters, then he is blaspheming Allah (blasphemy) and inciting communal violence, -- .

Conclusion.

The two prepositional phrases -- joined by "well now" -- lead to the postpositional phrase, introduced by "therefore" (= categorical wording);-- the two prepositional phrases -- joined by "if ... and if" lead to the postphrase, introduced by 'then'.

Note.-- Epistemologically, there is a clear difference: the one who speaks hypothetically keeps his distance: he/she sticks to merely assumed prepositions.

Logically, there is no difference at all.

Why not? Because 'traditional' logic only looks at the inference (Conclusion) whether it is formulated categorically or hypothetically (only the hypothetical formula applies). In other words: the categorical sentences, within traditional-logic, are covered ('disguised') or 'enthymematic' hypothetical sentences.

In this sense, J. Fr. Herbart (1 776/1841) wrote that in logic all

(1) to the language form categorical judgments in syllogism

(2) are in their true essence hypothetical judgments (G. Hartenstein, Hrsg., F.Fr. Herbart, *Sämtliche Werke*, (Complete Works) Hamburg/ Leipzig, 1850/1893, xxii, 506).

A serious misconception.

Bibl. t.: R. Caratini, *La philosophie*, II (Thèmes), Paris, Seghers, 1984, 43s..

Caratini writes there:

a. the system of traditional syllogistics is only a kind of "calculus" (logistics);

b. moreover, that system is "poor": it is useless for the purpose of discovering new judgments.

Logic - he says - is more 'honorable': its system makes available the means to combine "any type" of judgment in such a way that one arrives at logically valid after-thoughts; reason: by 'calculating' with 'realities' indicated by signs (symbols) (for this ontological basis is still there, if not the logistician calculates in the void) the operations acquire an 'automatic' character.

Answer.

1. That logicians classify their computational logic in a way different from traditional logic such that Aristotelian syllogism is only a subpart of it is normal. Logistics, after all, is computational thinking,--not traditional-logical thinking.

2. Up to now, all really traditional-logicians managed to formulate any new reality, as far as amenable to inference, strictly logically, if necessary syllogistically.

That logicians like a Caratini fail to see this is due to the fact that they commit a method error. They reason about traditional logic from the premises of their logistics,--not from the premises of traditional logic. This is called "externalism": to look at something, to analyze it, not from its own presuppositions (sense conception) (ETM--LOG 292), but from presuppositions (sense foundation; ibid.) that are alien to it, not its own.

The traditional-logician takes an internalist approach: he adheres strictly to the hypotheses that define that logic.

In the same way, logistics should not be rejected - as it often is - on the basis of its strange assumptions.

3. Within, therefore, the premises of traditional logic and in its own way, the inferences within or outside the syllogism are equally automatic: they depend, after all, not on subjective impressions but on objective identities, i.e., general identity of something with itself (something automatically includes itself) or partial (analogous) identity (collection/system: e.g., a whole automatically includes all its parts).

Other models.

Logicians blame traditional-logical language for not being able to rigorously articulate relations (ETM--HARM 77vv.) logically.

Two examples.

Cfr. G. Jacoby, 53/55 (Relationslogistik).

1.-- The relation "greater than".

Are we speaking, immediately, in syllogistic language.-- The relation "3 > 2" is, expressed in colloquial language, an applicative model (application) of the universal relation "greater than".

Syllogistic:

a. major (= first prepositional phrase): "The relation "x > y" is, e.g., rewritable in reverse order: "x > y" becomes, thus, "y < x";

b. minor (= second preposition): "Well, "3 > 2" is a single (singular) application of "x > y";

c. conclusio "Thus: '2 > 3'."

2.-- The reciprocal (symmetrical) relation.

Maior.

k1 and k2 as correlative, reciprocal terms encompass each other: if k1, then k2 and vice versa.

Minor.

Well, 'father' and 'son' are an applicative model of the rule "k1/ k2".

Conclusio.

So if 'father', then 'son' and vice versa.

Note.-- White have, above, ETM--HARM 72/102 (harmology/ relationship theory), dealt with relations outside of direct logical connection. Why? Because, within the presuppositions of traditional logics, relations in themselves contain nothing "logical. They are simply either total or partial (analogous) identities. 'Logical', within that tradition, is only "all that is consequential" (= all that is encompassing). When relations are viewed logically, they are included in the schema of the conditional or hypothetical sense, of which the syllogism is only one application.

Conclusion.-- The remarks of a number of logisticians concerning 'relationship logistics' "as more powerful than" traditional logic salvage the same logical error: they judge traditional logic from presuppositions (prepositions) which only apply to logistics. Immediately they testify to externalism error.

Note.-- Now reread ETM--LOG 307 (Galilei's error).-- Galilei, out of sheer bias, not to say "self-importance," continued to lock himself exclusively into his Early Rationalism,-- to judge from its hypotheses something that was not intelligible from those hypotheses. In other words: Galileo too committed an externalism error.

The so-called immediate distractions.

Bibl. s.: Ch. Lahr, *Logique*, 511/514 (La déduction immédiate).

Definitions. A. Exchange.

In the same sentence, one exchanges the subject with the predicate. Which is also called "conversion.

Appl. mod.--"Every girl is, normally, like to be pretty", "like to be pretty" becomes, conversion, to "Is, among other things, (subset indicating term) "like to be pretty", "every Young girl"

Basic.-- The distributive structure (ETM--HARM 90: metaphorical, collection-learning str.,): "every girl" is a subset (particulary) of "all that like to be beautiful"; the term 'normal' limited to a subset of the girls, of course. O.g.v. that premise, one can interchange one sentence with another,-- one "immediately inferring from the other."

Appl. mod.-- "Stamen partly (subset indicating term) make up the (understood as 'whole') flower" can be exchanged for "The (whole) flower is partly (subset indicating term) made up by stamen".

Basis.-- the collective structure (ETM--HARM 90: metonymic, system learning--systemic str.) is presupposed.

Note -- The presuppositions regarding distributive and collective structure actually make up a suppressed (enthymematic) preposition, which plays the role of 'major' (= first preposition).

B. Opposition.

Also called 'opposition'.-- Here the issue is either quantity (ETM 68: transcendental/ categorical (singular, private, universal)) or quality (ETM 68: affirming/ denying/ restrictive) or both together (leading to contradictory sentences).

Premise here is the logical square (ETM--HARM 144: value list), which is articulated in the subjunctive (enthymematic) major (first prepositional phrase).

Here is the diagram:	A (all)	E (none, all)
	I (some do)	O (some do not).

Appl. model.-- Let us take the contradictory sentences.

1. Distributive. A. Every flower blooms at its time,--is contradictory to O. Some flowers do not bloom at their time.

I. Some flowers bloom in her time,--is contradictory to E. No flower blooms in her time.

2. Collective. A. One (= all; ETM 23: synecdoche) flower contains stamens,-- is contradictory to O. Some flowers do not contain stamens:-- Thus sentence I and sentence E can also be contradictory.

Sample 41.-- Reasoning theory (syllogistics: typology) (314/322)

Let us now consider some of the classic types of keynote.

Bibl.s: Ch. Lahr, *Logique*, 519/521 (*Diverses formes du syllogisme*), 521/522 (Règles des figures), 524/527 (Diverses espèces de syllogismes), 527/528 (Syllogismes irréguliers).

The premise.-- The fact that there are many forms of syllogism is governed by two 'elements' (= parameters, factors).

a. *The figure* (diagram).-- The configuration (placement) of the three terms within the three sentences, viz. in which sentence they are either subject or predicate (refer to ETM--LOG 312 (alternation)) Which gives four figures.

b. *The 'mode*;'-- The quantity and quality of judgments (see ETM--LOG 312 (contradiction)) gives sixty-four possible 'configurations' (combinations, connections).

Final sum.-- If one combines the four figures and the sixty-four modes among themselves, one arrives at 64 x 4 = 256 types of syllogism, which were recorded by the Scholastics in mnemonic verse.

Second conclusion. Of those two hundred and fifty-six forms, nineteen are valid (logically correct) and five A six are common.

Note.-- Models of J. Lachelier (1832/1918; Kantian).-- He distinguishes aprioric (analytic) and aposterioric (synthetic) closure reasons.-- For example:

A. Apriori.

"All goddesses in mythology are destiny-defining and thus powerful. Well, Afrodite is such a goddess. So Afrodite is fated and therefore powerful;'

Explanation.-- This figure (look at the subjects and the sayings) exhibits a middle term, namely 'goddess(es)', whose content contains the trait "destiny determining and therefore powerful". Well, Aphrodite - as a member of the collection of goddesses - shows this content. So Aphrodite contains the attribute.

B. Aposterior.

"All the goddesses of Hellas are powerful. Well, these goddesses are cosmic 'elements' (in the sense of S. Paul, Col. and Gal.). So some cosmic 'elements' are powerful".

Explanation.-- The pronunciation of the nazin saying cannot be accounted for 'analytically' (ETM--LOG 293), i.e. based on mere decomposition of the terms, but it can be accounted for 'synthetically' (ETM -LOG 294), i.e. based on experience and research.

Conclusion.-- Every syllogism is either 'a-prior' or 'aposterior',-- according to Ch. Lahr, o.c., 524.

Irregular closing steps.
Bibl. st.: Ch. Lahr, *Logique*, 527/528 (Syllogismes irréguliers).

The three-part formula "preposition 1, preposition 2, postposition" occurs, in fact, mostly modified - simplified or e.g. combined.

Some types.
1.-- The enthymeme.
'Enthumema', in ancient Greek, means "what one keeps in one's inner being". So unstated, implied.-- Famous example: "The one who has an interest in committing the crime is guilty of it" (L. Annaeus Seneca of Cordoba (1/65; Stoicus; teacher of Emperor Nero), Medea).-- In context: "The one who has an interest in committing the crime is guilty of it. (Well, she has brought you benefit; so you are guilty);

2.-- The polysylogism.
Consecutive chaining of closing words,-- such that the after sentence of the preceding (first) is prefixed to the next.
What consists of no single (material) part cannot possibly disintegrate. Well the soul of man (the incorporeal soul, at least) does not consist of any (material) part. So the (incorporeal) soul of man cannot possibly disintegrate (die).-- Well, what cannot possibly disintegrate is immortal. So the 'human' (incorporeal) soul is immortal".

3.-- The sorites.
A series of sentences such that the saying of the previous becomes the subject of the next.-- "This river fizzes. What fizzes, moves. What moves is not frozen shut. What is not frozen shut cannot carry me. So this river cannot carry me; (Thus the fox reasons in one of the works of (Michel de) Montaigne (1533/1592; Skeptic)).

4.-- The epicheirema.
"Epicheirem," in ancient Greek, is "attack." -- Each preposition is immediately provided with a proof.
a. An unjust assailant may, in conscience, be killed.-- Both natural law and stilted (positive) law permit this (as lawful self-defense).
b. Well, Clodius (+/- -52, killed by gangs of Milo) was such an unjust assailant of Milo (-95/-48; people's tribune).-- Clodius' antecedents (past life), his companions, the type of his weapons prove it.-- So killing Clodius was for Milo an act justifiable in conscience.

Conclusion. The syllogistic form of reasoning is very frequent, but covert.

Paralogism/ sophistry.

'Paralogismos', in Antique Greek, is (conscious or unconscious) invalid reasoning.-- 'Sofisma' (later also 'sophismos') - so in Platon, The State 496a - means the same thing.-- In the later language of logic, paralogism means unconscious invalid reasoning, while sophistry denotes conscious invalid reasoning.

Note.-- Do not confuse 'sophistry' with (Proto)Sophistics.

1. Appl. Model.

Protagoras of Abdera (-460/-410; head of Protosofistics) taught Eualthes (Evalthes) rhetoric in return for payment: the first half was paid before teaching began; the second half was payable as soon as Eualthes won his first trial. Yet the cunning Eualthes did not plead! Whereupon Protagoras put him on trial. With following reasoning.

FS 1 (a dilemma): "Either ye win this trial or ye lose it."

FS 2: "Well, if you win, you are bound in conscience to the deal; if you lose, the judges sentence you to pay."

AS: "So, in both cases, ye pay."

To which Eualthes:

FS 1 (dilemma) : "Either I win or I lose".

FS 2: "Well, if I win, the judges acquit me; if I lose, I keep the bargain;

AS: "So in both cases I don't pay".

Note.-- Such cleverness, characteristic of the Sophists, belongs in the 'eristics', praxis and theory concerning clever reasoning. Among which very expert reasoning may be found.

2. Appl. Model.

Epikoeros of Samos (- 41/-271; father of "Epikurism," one kind of Hedonism) wanted to push through death as "nothing terrifying" at all costs (ETM--LOG 307).

FS 1. (dilemma): "Either our soul dies with the biological body or it survives."

FS 2.: "Well, if she dies with her biological body, then she no longer possesses any experience and, immediately, she does not live through any calamity; if she survives, then (she is free from bodily calamities and thus) she is happier than in the embodied state."

AS . "So, in both cases, death is not frightening.

Note -- Epikoeros omits a third possibility: the soul survives and she either experiences remorse about all kinds of miscalculations in her life and/or she experiences remorse about committed errors ('sins') in her past earthly life! He presents a false dilemma.

The proof from the absurd (apagogic proof).
Bibl. s.: -- W.C. Salmon, *Logic*, 32/34 (The dilemma);
-- Ch. Lahr, *Logique*, 528 (Le dilemme).

Definition.-- Two definitions.
(1) Either p (model or q (counter-model); well, if p, then r and if q, then s; so either r or s. One can see that the dilemma - as Lahr says - involves two contradictory, "conflicting" ("contradictory") models.

(2) Either p or -p (negate of p); well, if p, then r and if -p, then also r; so r.-- This is the stricter form. "The dilemma is a concluding statement that is twofold (two sentences) but ends in the same conclusion" (Lahr, 5?8).

The Latin name "reductio ad absurdum" literally: "reduction to the absurd". Aristotle called this "apagogogee", apagogic reasoning.

According to D. Nauta, *Logic and Model*, Bussum, 1970,27v., the Paleopythagorean mathematicians already knew the proof from The Incongruous, i.e. from that which is impossible, unthinkable, absurd, meaningless and therefore nothing. Cfr ETM 70 (primal dilemma).

"The finest achievement of the Pythagoreans, however, is that they proved that it is impossible to find a rational model (a fraction) for the square root of the number 2 (V2). That is, for the number whose square is 2.(...). The finest example of a proof from the incongruous from antiquity.

a. In a proof from the absurd, one assumes (op.: hypothesis, presupposition) that there exists a counter-model,--i.e., an example ("instance"), which satisfies the particulars of the problem but does not satisfy the demanded (that which is to be proved).

b. -- In a systematic way, one then shows that such a counter-model cannot exist, in that it leads to an incongruity or contradiction (other terms for this: 'contradiction', 'paradox').-- With this, it is then proved that any object that satisfies the data must also satisfy the demanded one." (O.c., 27v.).

Note.-- The "ad hominem" argument.
This is reasoning played out against "man," someone.
FS 1: Thou claims p.
FS 2: Well, p leads logically to unacceptable,--eventually incongruous conclusions.
AS: So (what thou art claiming, viz.) p is unacceptable, eventually incongruous".

Thus, one does not confuse this rather significant (i.e., the (good or bad) understanding concerning) reasoning with any refutation.

A famous example of such a significant reasoning that plays the opponent, aptly, against himself is from Zenon of Elea (ETM 08): “Thou, opponent, neither like me, proves decisively what thou art asserting.

Appl. model. Platon, Politeia 1.

1.-- The thesis (judgment) of Cephalos (Lat.: Cephalus).

The conversation -- the dialogue -- is about conscientious living, -- in ancient Greek “justice. According to the Socratic method, one is looking for a definition, i.e., an articulation of the content of a concept such that it fits all cases without exception.

Cephalos’s definition reads, “Justice is (1) always telling the truth and (2) always getting justice.

2.-- The ‘antilogia’, consideration, of Platon.

Platon applies here what he calls ‘sunthesis’, i.e. starting from propositions and reasoning through from there (forward, progressive dialectic). In other words: the axiomatic-deductive method: given a number of axiomata (premises), what follows from that?

Applied: let us assume that this definition is correct, what is deducible from it? (= ‘sunthesis’).

Note -- Since we do not know whether this definition is correct and at the same time pretend it is correct, we have here a lemma, an undefined, inexplicable proposition, to which we apply an ‘analusis’, a dissection. In other words: the lemmaticanalytic method.

“If a friend, right in his mind, entrusts you with weapons, but later, having become insane, asks for them back, and if you, Cephalos give them back to him -- he has a ‘right’ to them -- no one will say that, in that hypothesis, you are acting ‘righteously’ (conscientiously),--that you, i.e., have the ethical duty ‘to give back weapons to an insanity’.

Explanation.-- Platon draws an unacceptable conclusion from Kefalos’ thesis (definition). Understood is the fact that whoever provides weapons to an insane person becomes co-responsible and, if necessary, complicit in evil done by others. Which is ethically “sin.

It is an “argumentum ad hominem,” supported on an absurd conclusion.

Note. - It should be noted that no one should always tell the truth: e.g. those who are bound by professional secrecy (priest, physician, psychologist) are in the same case.

The four platonic closing reason.

Platon never wrote an actual logic. He did, however, continually apply one. By patient reading one can find them out very well.-- Listening to a connoisseur, Father E. De Strycker, *Concise History of Antique Philosophy*, Antwerp, 1967, 104.

"The analysis - Opm.-- 'analusis' - or the search for the propositions from which a certain proposition can, be proved. (...).

The synthesis - Opm.-- 'sunthesis' - which is the inverse of 'analysis': from a given proposition one proves another". We are now going to give this a syllogistic form.

1.-- The deductive syllogism.

As is clear, in Kantian terms (ETM--LOG 293), a true deduction is an 'analytic', i.e., on mere dissection ('analysis' in the Kantian sense) of the terms--subjects, sayings supported closered type. Cfr ETM--LOG 313 ('a-priori'), -- ETM-- LOG 312 (logical square). Consequence: deduction is as good as an "immediate derivation"; reason: the very most basic insights, proper to set theory and/or systems theory, are at work.-- Deduction is immediately a necessary derivation (ETM 302).

Models.-- There are metaphorical (set theory) and metonymical (system theory) models.-- The former rely on "all" the latter rely on "whole" (ETM --HARM 92, 97).

1.a.-- Metaphorically.

Let us take the bean example from Peirce (ETM--LOG 318).

FS 1.-- All the beans in this bag are white. FS 2.-- Well, this bean (singular), these beans (private) come from this bag. AS.-- So this bean, these beans are white.

1.b.-- Metonymic.

FS 1.-- The whole bean is white. FS 2.-- Well this is a part of the whole bean. AS.-- So this part is white.

Behold what Platon, had he been very explicitly familiar with the syllogism newly founded by Aristotle, would have called 'sunthesis' - poorly translated in our present language by 'analysis' - , i.e. deduction.

To explain.

A.-- FS 1.-- All computer systems consist of a number of components.
FS 2.-- Well, this here is a specimen of such a computer system.
AS.-- So it consists of a number of parts.

B.-- FS 1.-- The entire computer system includes all parts.
FS 2.-- Well, this is a whole computer system.
AS.-- So it includes all the parts.

2.-- The inductive syllogism.

Basic reasoning.-- "if x, then y understandable. Well, y. therefore x".

One knows the enormous role of induction in Socratic and Platonic thought. All data - facts - come from that one source. Even our ontological understanding - and Platon in particular was radically ontological - rests solely on induction. In modal terms: induction is not necessary (possible) -- in Kantian terms: 'synthetic' (based on testing of facts).

From summative to amplificative induction.

Cfr. ETM--LOG 236/ 241 (induction).-- As the examples will show:

a. FS 1 and FS 2 (the two premises) represent the summative induction (summary of the verified samples);

b. AS represents the amplifying, knowledge-expanding induction (summary of verifiable samples).

Models: -- Again: metaphoric and metonymic.

2.a. Metaphorically.

FS1: This bean, these beans come from this bag. FS.2. Well, this bean, these beans come are white. from this bag. AS. -- So all the beans in this bag are white.

2.b. Metonymic:

FS.1. This is one part of a bean. FS.2. Well, it is white. AS. So the whole bean is white.

A textbook example.

To show that metonymic induction is everyday reasoning, the following -- A teacher is walking with the children in the woods -- "visual instruction"--. Suddenly a girl comes running with a beautiful striped plume.

Reasoning

(1) It is clear -- to those who know the whole bird -- that that plume is a sample in the whole body of the bird,--that it is the encompassing system in which, among other things, a plume-set has its place.

(2) So much for summative induction (verified factual knowledge).-- Now for knowledge-expanding induction: a child, acquainted with birds, says, "Wouldn't that plume with the pretty stripes be that of a magpie?" That is the conjecture,--what Peirce calls "Abduction" quite, or also "hypothesis. But the metaphorical induction also contains 'Hypothesis' (ETM--LOG 240: induction problem).

Or in modal terms: a non-necessary derivation. In other words: without further research - new samples - it is not certain that the AS is correct. It may also be different.

Conclusion.-- Peirce distinguishes three types. Platonically, there are four.

Statistics.

B. Disraeli (1804/1881; English statesman) once said, “There are three kinds of lies: lies, damned lies and ... statistics”. (D. Huff, *Use and abuse of statistics*, Utr./ Antw.,1960, 6).

Bibl. st.:

-- W.C. Salmon, *Logic*, 55/63 (Induction by enumeration; Statistics);

-- I. Adler, *Probability calculus and statistics*, Utr./Antwerp, 1966.

A.-- universal and statistical induction.

a.-- FS 1: These beans come from this bag (private); FS 2: Well, these beans are 63% white. AS: So the complement (= the rest; ETM--HARM 125) of these beans is 63% white.

b.-- FS 1: This handful of beans (private) comes from this bag. FS 2: Well, these beans are 63 white. AS: So the next bean is, 63 chances out of 100, white.

Note -- Note the difference of the descendants:

a. beats the remainder (= subset); b. beats the one following bean (= singular).-- Again, from summative (FS 1 and 2) to amplificational (AS) induction.

Further: universal induction: either 100% or 0% (all/ none; whole/ nothing); statistical induction: the research result that differs from it.

B.-- Statistics.

A professional science.-- Material object: a multiplicity (collection: metaphorical; system: metonymical) that is not immediately transparent, surveyable. Thus e.g. a whole population for a government (from ‘status’, state, comes the term ‘statistics’).

Formal object:

a. that multiplicity is subjected to statistical induction, e.g. summarized in the numbers of a census and classification (ETM 228 (taxonomy));

b. two aspects:

b.1. Summative statistics (the verified cases);

b.2. Amplificational statistics: from those cases tested, one concludes, conjecturally, including by probability theory, to approximations.

Critique. -- Statistics is subject to all the laws of induction.

The foundation, the summative portion, may be insufficient.

a. Quantitatively.-- One has taken too few samples.

b. Qualitative.-- One has not, e.g., proceeded haphazardly (in English ‘at random’, -- hence ‘randomization’)), but one-sidedly.-- This apparently happens regularly in ‘surveys’, opinion polls They therefore regularly come out wrong. Think of opinion research organizations that publish predictions, which do not differ that much from those of card readers or ‘clairvoyants’.

The idiographic induction.

Resume ETM--LOG 279 (collective induction).

A. The diagram:

FS 1: If the know traits (properties) x, y, z, then the singular (individually given); FS 2: Well, x, y, z; AS: So the individually given.

This is the deductive scheme.-- Applied to Roxana: FS 1: If wife, very beautiful, daughter of, etc. (ETM --LOG 278), then Roxana; FS 2: Well, wife, very beautiful, etc.; AS: So Roxana.-- This is not knowledge-expanding, (in Kantian terms: 'analytic', relying on the analysis of the terms themselves).

B. The schedule:

FS 1: If the knowledge traits x, y, z, then the singularity (the individual data);

FS 2: Well, the singularity; AS : So the attributes x, y, z.-

That's the inductive scheme.-- Applied to Roxana: FS 1: If wife, very pretty, daughter of, etc., then Roxana; FS 2: Well, Roxana; AS: So wife, very pretty, etc.-- This is knowledge-expanding, amplifying (in Kantian terms: 'synthetic', relied on sampling, induction).

Note.-- Bibl. st: I.M. Bochenski, *Philosophical Methods in Modern Science*, Utr./ Antw., 1961, 187/171 (Historical Method).

To begin with, the method of idiography (individuology) is applicable to more than history. Bochenski begins by saying that idiographic sciences "do not only describe (= direct method), but also explain (indirect method)" (o.c., 163).-- The explanation of the data is, apparently, twofold.

1. What Bochenski calls "induction," i.e., habitual generalization. Think of people who derive statistics from historical or geographical documentation.

2. What Bochenski calls 'reduction', but in a non-inductive sense (as he points it out). Cfr o.c.,166, where he very emphatically calls historical sciences 'idiographic sciences'.

Appl. model.

Given.-- The fact that Alexander the Great, at the time, went up to India precisely.

Asked.-- The explanation of that unique fact.

(a) It may be that Alexander, like so many others, was suffering from land hunger. If so, this is deadly induction.

(b) But it may also be that some very individual reason drove him to do so.

How to determine this? By taking samples in the available material. Which then again is induction, but of a type described above. Samples define every induction, including idiographic ones.

Sample 42.-- Methodology (applied logic) (323/329).

Bibl. s.: regarding the Platonic methods:

-- V. Goldschmidt, Les dialogues de Platon (Structure et méthode dialectiques), (Plato's dialogues (Dialectical structure and method)), Paris, PUF,1947;

Regarding Socratic methods:

a. E. De Strycker, *Concise History of Antique Philosophy*, Antwerp, 1967, 90 (dialogue),-- 73/ 75 (induction);

-- **b.1**. E. De Strycker, o.c., 103/104 (*hypothetical method*);

-- W. Klever, *Dialectical thinking*, Bussum, 1981, 28/55 (*hypothetical method*);

-- E.W. Beth, *The Philosophy of Mathematics*, Antwerp/ Nijmegen, 1944, 29/56 (anamnetic method; stechiotic method);

-- E. De Strycker, o.c., 104/105 (*dietary synoptic method*);

-- R. Baccou, intr./ trad., Platon, *La république*, Paris, Flammarion, 1966, 445/458 (mathematical methods);

-- b.2. O. Willmann, *Abriss der Philosophie (Philosophische Propädeutik)*, (Outline of Philosophy (Philosophical Propaedeutics)), Wien, Herder, 1959, 137 (lemmatic-analytic method).

That is about the main thing. We have already given - apart from the strictly mathematical and the anamnetic (= reincarnate) methods - quite a few stipulations and examples.

Bibl. s.: regarding general works.

-- I.M. Bochenski, O.P., *Philosophical Methods in Modern Science*, Utr./ Antw., 1961 (1. Phenomenological meth.; 2. semiotic meth.; 3. axiomatic meth.; 4. reductive meth.);

-- Ch. Lahr, S.J., *Logique*; Paris, 1933-27, 533/659 (Logique applique ou méthodologie) (La science et les sciences;-- Méthode générale (L'analyse et la synthese); Méthodes particulières (Sciences mathématiques, de la nature (physico-chimiques, biologiques), morales et sociales (= humaines) (histoire, sciences sociales)).

The concept of approach (method).

'Methodos', in ancient Greek, means 'the way to a goal'. The concept of 'purposefulness' governs, radically, any rational, spirit-filled method. This includes, among other things, and above all, even the principle of economy or economy of savings: reaching the goal with a minimum (minimization) of means.

Logic and method theory.

Logic can be defined, among other things, as the theory concerning the premises that govern any valid inference.

Methodology then becomes application: it is the theory concerning the premises that govern valid inferences once they are at work outside the realm of strict logic.

Epistemological definition.

As has been said several times: the science, indeed the theory of knowledge, is the theory concerning our knowledge insofar as it contains truth - the truth concerning reality. If logic is interested in inference, epistemology is interested in truth.

Let us note the definition of Ch. Lahr, *Logique*, 548: "Method is the collection (and system) of processes - 'procedures' - which the human mind should apply (1) in the course of its research work. (Note -- what Herodotos would call 'historiè', collection of information) - and (2) the argument

Note -- what Herodotos would call 'logos', text - , insofar as these two are aligned with truth." -- With this mode of definition, Lahr sets off

(a) against pure logic, which is interested not in truth but only in valid inference, and

(b) against any sepsis, i.e. doubt as to whether truth is unquestionably possible in our knowing life,-- 'skepticism' then in the extreme sense.

Logic and methods in the professional sciences.

If we go over the list of Lahr's method chapters, we see an order of sciences: mathematics - natural science and biology - humanities or humanities (which until 1950+ were called 'moral and political' sciences)

One can, of course, classify the sciences in many ways. - But Lahr's order does not seem so bad, even today. As witness: D. Nauta, Inleiding tot het modelbegrip, (Introduction to the model concept), Bussum, De Haan,1969, 43/47 (Classification of the sciences and a first arrangement of model concepts).

O.c., 44, ranks Nauta as follows:

a. formal sciences (mathematics/logistics);

b. empirical sciences: natural sciences (astronomy, geology, physics and chemistry,-- biology); -- 'Social' (note: better true: human) sciences (psychology,-- sociology, culturology);-- applied sciences (technology).

Conclusion.

Once outside pure logic, one has to deal either with the whole of reality (ontology) or with sub-areas of it (professional sciences) The approach - method, method of approach - although governed by one and the same logic, reflects the object. Hence, each science develops its own methods.

Sometimes one speaks of "the inherent logic" of any science. This is a metonymic mode of speaking: one speaks of applied logic in terms of pure logic. In fact, it is about "one's own application of logic".

Towards a definition of strict professional science.

Bibl. s.: -- Fr. Guéry, *L' Epistémologie* (*Une théorie des sciences*), (Epistemology (A theory of science),), in: A. Noiray, dir., La philosophie, Paris, 1969-1, 1972-2, t. I, 135/178;

-- P. De Meester et al, ed., *Science now and tomorrow*, Leuven, Univ. Press, 1989. P. De Meester et al, Dividing the sciences into four sectors:

a. Humanities and behavioral sciences, including more recent ones such as literary studies, musicology, anthropology (ethnology), communication studies;

b. Natural sciences and technical sciences, as well as medical sciences, including the more recent ones such as computer science, artificial intelligence, molecular biology, mechanical engineering and robotics,-- further: human heredity and embryology, infections (infections) and immunity, neuroscience.-- The question arises: how does one now delineate such a subject science?

Material and formal object.

This concept pairing is Scholastic, but it remains useful.

Appl. model.-- To borrow an example from G. Hegel (1770/1831), the great German or Absolute Idealist.--

a. Take a beautiful apple.

That is the material, i.e., undeclared, uninterpreted object. Cf. ETM--LOG 292: that is grasped by sense-making.

b.1. A girl comes home from school hungry, full of appetite: for her, that apple is something edible that satisfies appetite (= first sense of purpose).

b.2. A dendrologist (arborist) confronted with the same apple, sees it as the fruit, successful or not, of a type of 'tree', (= second sentence foundation).

b.3. A painter sees the same apple as a beautiful model, as an object "to be painted" (= third sense).

Conclusion.-- Scholastics (800/1450) will summarize, "The same apple, material object,--three times formal object (object of interpretation)."

Note.-- Transposed into the language of Cognitive psychologists: the respective understanding that girl, dendrologist, painter have of the same reality is selective (singling out, shifting): "Only the relevant in the object is brought out by the understanding". (R.Pinxten, *The Notion of Concept in Cognitive Psychology (An Overview and Critical Analysis),* in: Philosophica Gandensia, Meppel, New Series 10(1972): 14/42).

Note.-- Ch. S. Peirce would see this confirmed that man, indeed, every being is an interpreter (interpreter, signifier/meaner).

The opinion of Fr. Guéry. (324/326)
His definition of science can be summarized as follows.

A.-- Material object.
Anything - for some time now there has even been a scandalology, the science of (political and other) scandals - can be the object of scientific research and textualization. The only thing: it must be firmly delineated against the rest. Now reread ETM--LOG 306v. (authority limitation).

Even the "domain" of ontology, although it seeks to explore all reality (collection) and all reality, is delineated: it is about reality insofar as it is real,--not about this or that reality.-- One could call this a first form of "abstractive" working. Or, with ETM. Husserl, the intentional-phenomenologist, a first form of 'reduction' (reduction to one domain). The real professional' concerning science limits himself, specializes.

Consideration.
Guéry limits, apparently by definition, the domain of sciences to the "secular" (secular, secular).-- Now reread ETM 18 (transempiria, transrationality).
Such a position strongly resembles 'ideology', namely secularism, i.e. not wanting to know that the concept of 'reality' also extends, as the case may be, beyond the domain of these earthly, visible and tangible data. - In any case it is a type of exclusive thinking.

Appl. mod.-- Bibl. s.: *Découverte*.-- *Crapauds contre infections*, (Discovery -- Toads versus infections), in: Journal de Genève 30.12.1987.-- True foraging work -- "history," in Herodotos's language -- knows no exclusivism: it is inclusive, inclusionary.

(1) One is familiar with the strange and repulsive practice of witches and other occultists of preparing one or another 'brew' (for healing, for example) in a cauldron - the infamous Witches' Cauldron.
(2) Well, it turns out that one of the elements of preparation was to "throw a pad into the boiling cauldron." -- Hegel says somewhere that all that man does "is somewhere reasonable, reasoned, justifiable, and therefore real, i.e. based on something real.

To the point now.-- the 'accidental' discovery of m. Zasluff.-- Michael Zasloff, biologist (National Institutes of Health USA), used, for his experiments, toads of the genus Xenopus.

a. One day he was struck by the speed with which these little animals, once they had undergone a surgical operation, healed,--in non-sterile water.
b. In the process, he came up with the idea of venturing further experimentation.

‘Lemma’: as a ‘hypothesis’ he designed the fact that the xenopus might contain ‘something’ - an ‘x’, a ‘black box’ perhaps - that strengthens the immune system (‘immune system’). From there he designs (progressive deduction) a series of experiments.

The result.

This amounts to a series of inductions.

1.1. Zasloff discovers a new class of molecules, -- with microbendicidal features. He calls them -- after the Hebrew word “magain” (shield) -- “mageinines. These are two small proteins that are present, in abundance, in the skin of frog-like animals.-- Remarkable: they represent a defense mechanism independent of the immune system. They appear to be able to rapidly inhibit proliferation of numerous species of bacteria, fungi, yeasts and even primordial animals (single-celled organisms).

1.2. From this summative to an amplificative induction: occasionally magainins serve to treat numerous infections.

2.1. Zasloff succeeded in segregating the gene controlling the magainins.

2.2. Amplificative induction: would not such molecules also occur in humans?

Note -- Well known is the work of Paul Feyerabend, one of the four great epistemologists, *Against Method*. In that work he pleads for an ‘open’, inclusive epistemology, -- for what he calls “proliferation of scientific hypotheses”! Here we have a brief application of this:

a. outside of any conscious method, Zasloff discovers a fact by chance - i.e. non-methodically;

b. The fact that Premodern occultists somewhere, mantically (ETM--LOG 242: Primitives also think and have intuitions that are valid; see also ETM 41: Postmodern openness), made real discoveries makes one think: ‘proliferation’ regarding science also means that one allows even Primitive, ‘mythical’ (ETM 05) people with their hypotheses a place within the rigid, ‘rational’ framework of our current science.

Conclusion.-- Secularism in defining science is not entirely justifiable.

B.-- formal object.

How, now, does the scientist address the material, unduberant object? Guéry: d.m.v.:

I. Description (diachronic: narrative),

II. Explanation (hypothesis) with testing of the statement, In Herodotos’ language; by means of ‘historia (Lat.: inquisitio, search of data and ‘logos’ (Lat.: ratio, text).

Where the emphasis seems to be on the intersubjective character: not the individual, the scientist alone, but "the scientific community" are the actors.-- In the language of Peirce: "sensus catholicus" (general opinion). In that of Josiah Royce (1855/1916; American Idealist): "the interpreting community".

Explanation.

Bibl. s.:

-- Claude Bonnafont, trad., Colin Roman, *Histoire mondiale des sciences*, (World history of science,), Paris, Sueil;

-- J.D. Bernal, *The Dimension of the Scientific Revolution*, in: Br. Tierney et al, ed., Great Issues in Western Civilization, II, New York / Toronto, 1967, 4/17;

-- H.Fr. Judson, *On the Barricades*, in: The Sciences (New York), 1985: July-August, 54/59 (a review of I. Bernard Cohen, *Revolution in Science*, Harvard University Press).

Egyptians, Greeks, Arabs,--Chinese, -- they all, each in their own way, founded "science. But from the XVIIth century onward, through a whole series of revolutions,--scientific revolutions then--, modern science gradually becomes an all-pervasive fact.

Bernard Cohen is a critic of Thomas Kuhn, The Structure of Scientific Revolutions (1962), which distinguishes between "normal" and "revolutionary" science,-- depending on whether practitioners follow an established pattern ("paradigm") or establish a revolutionary pattern.

Cohen has three comments.

a. The notion of a' paradigm', with Kuhn, is fluid: sometimes a tonal method, sometimes a set of presuppositions;

b. A reversal, "revolution," in science is therefore an abrupt, gap-representing replacement of one paradigm by another;

c. consequence: the concepts, the theories among others before and after such a reversal, are not open to comparison (gaps, fractures).

Which Cohen doubts. He distinguishes a four-stage revolution.

1. Someone, a single person, or also a group(s) discovers a new conception (interpretation) in response to facts (data),--which is the actual "revolution.

2. In private circles still the new discoveries are recorded in texts (notes), in the real conviction that one is experiencing a revolution.

3. The opinion is published,-- among friends, colleagues, -- in the world of scientists. What Cohen calls "the revolution on paper".

4. Follows the reaction of the scientific community-"the scientific community"-. Curious: these four phases can extend over decades, indeed centuries. Like e.g. the Copernican revolution.

The opinion of the Starnbergers.

The material -- undefined, discovered by sense -- object,-- that is one; the formal object -- approach from a perspective (Fr. Nietzsche) or special angle of view --, that is two. Guéry sees this clearly. But the formal object is determined by more than the method, applied over time by the research community.

Bibl. s.:

-- G. Böhme u.a., *Alternativen der Wissenschaft*, (Science Alternatives), Frankf.a.M., Suhrkamp, 1980;

-- id., *Die gesellschaftliche Orientierung des wissenschaftlichen Fortschritts*, (The social orientation of scientific progress), Frankf. a.M., Suhrkamp,1978;

-- M. Deblonde, *Science in the service of emancipation*? (The model of the Starnbergers), in: Strive 1990: April, 640/650.

Reread ETM--LOG 310 (externalism/internalism),-- 307 (willfulness/preference).

a. The 'Starnberger Gruppe' is a metonymy for a group of researchers, working at the Max Planck Institut, in Starnberg near Munich. Names: Gernot Böhme, Wolf-gang van den Daele, Wolfgang Krohn, Wolf Schäfer.

b. Main theme: internal science development as far as influenced by external, primarily political factors. This since the rise of the Modern sciences in the course of especially the XVIIth century.

The Starnberger are far from alone: at the 32nd Flemish Philologists' Congress (Leuven 1970), internal questions (what and how questions, i.e. concept formation and method) as well as external questions (why questions, i.e. ethical-political consequences) of the human sciences were explicitly discussed.

As an aside, this is one of many possible applications of the inward and outward equation (ETM--HARM 131).

We have, very briefly, ourselves already pointed out the purely economic factors,-- ETM--LOG 307 (economic returns to science practice). -- The Starnberger emphasis is mainly on political elements that determine the practice of science.

a. Supposedly, foragers only steer toward "free" (free from any external influence) research.

b. In fact, this is very often the cover for political Conclusions, according to the

Starnberger Capitalist Conclusions. With the result that scholarship by the foraging community does not have a "de-legitimizing" ("emancipatory") effect on society as a whole.

Conclusion.-- The so-called exploratory community merges, as far as goal-setting is concerned, with the economic and political community.-- Which, however, in my opinion, is not only a characteristic of the capitalist West alone.

Sample 43.-- Methodology (theory). (330/336)

Reread for a moment ETM--LOG 227 (Platonic 'theoria').

In the Antique sense, 'theory' means 'insight', especially "insight into the presuppositions".-- That meaning lives on to our day, but updated (adapted to the current situation, reestablished).

Two statements.

Joh. W. Goethe (1749/1832; German poet) once wrote a phrase, strongly Romantic in nature: "Grau, mein Freund, ist alle Theorie und grün des Lebens goldner Baum" (Gray - colorless -, my friend, is all theory and green - colorful - of life's golden tree).

The Romantics situated everything -- including the science of the Enlightenment rationalists -- in life (i.e., the cosmos as a coherence of life).-- Yet it is apparently not that simple: Carl Rogers (1902/1986) once agreed with Kurt Lewin's (1890/1947) saying, "nothing is so practical as a good theory."

Definition.

The term "theory" has more than one meaning.

A.-- In response to a fact -- e.g., the political situation, e.g., the arts -- people design a more or less coherent 'system' of opinions' that is then called "political theory; "artistic (aesthetic) theory."

B.-- In response to a set of data (summative induction), scientists develop a more or less - preferably rigorous - coherent system of propositions (judgments) such that the data become understandable (explained).

Note.-- Sometimes the verified part of a science is contrasted with the perhaps verifiable part, which is then called 'mere theory'. Thus, e.g., Ch. Lahr, *Logique,* 598s....

Similarly, A. Chalmers, *What is called science*? (On the nature and status of science and its methods), Meppel/ Amsterdam, 1981. This work discusses the four great epistemologists - Karl Popper (1902/1994), Thomas Kuhn (1922/1996), Imre Lakatos (1922/1974), Paul Feyerabend (1924/1994). The focus is on theory formation (its origins and ongoing developments).

But listen: according to Chalmers himself, theories are 'constructions' (products of the mind), -- alongside 'reality'. They only represent 'reality' insofar as it comes through in the praxis itself of the investigative work.-- Which, properly understood, in our language, means that from the material also only what is the formal object comes through, namely an interpretation, however well-founded this may be.

Two main types: Deductive and inductive theories.

Theories reflect reasoning types.

Now reread ETM--LOG 318/319 (the four Platonic main types of reasoning) for a moment.

A. - Deductive type.

We met two specimens of deductivism.

a. The dialectic. ETM--HARM 159.-- The basic concepts of "totality;" "change" ("movement") "qualitative leaps" and "purification" ("synthesis on a higher plane") define the strongly deductive pattern (pattern) of the Hegelian and the Marxian method. Systematically, persistently, Hegel and Marx approach all data with those four axiomata in mind (which constitutes their formal object).

b. -- Formalized systems. Now reread ETM--LOG 256/259 (Peano's number definition). 'Primitive' notions and judgments (axiomata) form the presuppositional part. From there one then reasons on,-- deductively. Since one starts from 'axiomata', this method is called "the axiomatic-deductive method" in the stricter sense.-- Indeed: compared to Hegel's and Marx's dialectics, what stands out here is the stricter logic, in the sense that one pays close attention to the very limited number of prepositions and to the very precisely defined rules of deduction (i.e., procedures applicable to the operations).

Note.-- Do not confuse the term 'rules' (in operations) with the term 'laws' (generally applicable theorems).-- In Platonic language: 'synthetic method' .

B. - Inductive type.

We summarize as best we can an inductive theory, namely ETM--HARM 164/184 (chaology). Here we do not presuppose a number of axiomata, which are then methodically applied. No! First there were laboratory results of e.g. chemical nature. In Platonic language: one proceeded 'analytically', i.e. asking backwards for the secret presuppositions. Inductively.

"Hard (rock-hard) and soft science"

'Hard Science'/ 'Soft Science'. -- One can use that pair of terms in more than one sense.

Operationalism.-- Also "Operationism.

Bibl. s.: Bridgman, *The Logic of Modern Physics*, New York, 1927-1, 1960-2.-- To define within 'operational' framework - ETM--LOG 250;-- 254 - is to define in terms of 'operations' (operations, actions).

According to one Bridgman, what follows is added.

1.-- Every natural science operation employs the necessary infrastructure (e.g., measuring instruments, observation harnesses),-- as the extension of exact sensory observations.

2.-- Every natural scientific act grows into some form of measurement.

Appl. mod.-- The physical concept of length, e.g., is defined exclusively by the modes of action that, equipped by infrastructure and accompanying numerical data, measure a singular-concrete length.

Appl. model.-- Bibl. s.: S. Erkman, *Accelerateurs de particules* (*Histoire du plus long défaut du monde*),(Particle accelerators (History of the world's longest fault)) in: Journal de Genève 09.02.1991.-- Known is the CERN (Centre européen de recherche nuclear) in Geneva, with its annular corridor, some hundred meters underground, 27 km. long. Purpose: microphysical experiments. - In order to study the fine structure of matter, one accelerates particles (protons, electrons, -- quarks) and makes them collide.

During the first tests (1988), the particles behaved "a little oddly". Months of testing (measurements, hypotheses of all kinds) revealed that the nickel (a magnetic substance), within the magnetic field caused by the large magnets around the kilometer-long empty chamber, creates disturbances, with the result: the tested particles do not follow the exact desired path. Result: the whole experiment is partially spoiled,

Conclusion.-- Boulder science has, apparently, very high, among other technological requirements.

Analogy.-- With Bridgman, Operationalism was first of all a method within physics.

Some human scientists have wanted to extend them to the human sciences. Thus psychology: Stevens (1935; 1939), Tolman (1936). Every 'subjective' (or dismissed as 'subjective') aspect of these human sciences had to be eliminated at all costs: introspection, -- vitalist and finalist concepts, etc.. Actions determined by methods of measurement predominate.

J. Piaget (1896/1980; genetic psychologist; Structuralist) held, in 1967, that according to Operationalism, the element of "human intervention" in science "distorts objective reality" (note: the material object). The goal of the Operational Method is to cut out that distortion factor.

Falsificationism (K. Popper).

K. Popper, the famed epistemologist, believes much more in falsification (testing with a negative result) than in verification.-- To clarify this subtle difference briefly the following.

Bibl. s.: A.P., *Commonly used drug worsens Alzheimer's disease*, in: The New Guide 30.08.1990.-- It is the New England Journal of Medecine that issued the news.

1. Hydergine

Hydergine was, through August 1990, number eleven on the list of the most prescribed drugs in the world. It had been on the market for twenty years. -- In the USA, it was even the only medicine authorized for Alzheimer's patients (a kind of premature insanity), for whom it was supposed to counteract a number of symptoms (including memory loss).

2. Assessment.

a. Structure.-- Number of subjects: 80.-- Administration and of a placebo (pseudo drug without any active substance) and of doses of hydergine. -

Randomization Neither patients nor doctors knew who had received what. This was to eliminate the influence of positive or negative thinking (ETM 35) (Something that sometimes plays a decisive role in healing, as all doctors - if honest - can see on a daily basis).

b. Rash.-- Those who were given hydergine aborted faster than those who were given a placebo. For the researchers at the University of Colorado Medical School, the results were "surprising", indeed puzzling.-- It may well be that the patients who had been "treated" with hydergine for twenty years, as well as their relatives and acquaintances, had not heard of it.

One wonders what powers of observation all these doctors have been demonstrating all this time. Is it to be wondered at then that Operationalists want to eliminate "the human factor" in research work ... to take only materially testable and visible results seriously? Operationalism has sometimes been heavily criticized. And rightly so: the human factor can sometimes work for the better, against all infrastructures and measurements. But the hydergine case proves that this same human factor sometimes has a very negative - "subjective", say the operationalists - effect on the testing of drugs by doctors.

Is it any wonder, then, that more and more patients/patients, in identifying the perceptual deficiencies of "scientifically" trained physicians, end up with "quacks"?

Science and Postmodernity.

Reread WDM 41.

Bibl. s.: G. Lernout, *Postmodernism*, in: Streven 1986- Oct.), 33/44.

Lernout's thesis boils down to this.

A. - A certain classical tradition concerning philosophy and sciences

This one puts - what it calls "the architectural metaphor" at the center. What does this expression mean?

(1) Thinking, if worthy of the name, is logical through and through.

(2) The question of presuppositions - either forward (deductive thinking) or backward (inductive thinking) - is also central. Among the presuppositions - called 'foundations; 'fundamentals' - there are those that are a. strictly provable and b. eternal. The rest are uncertain or, at least, disputable(s).

Now for the metaphor, covering a comparison: just as a building rests on foundations, on a real pedestal, on "solid ground" so too our thinking rests on a fixed pedestal, those eternal strictly provable foundations. Whatever may be called "Fundation(al)ism" or "Fundamentalism.

B. -- The Postmodern sense of thought is totally different.

Here "the network metaphor" applies

(1) Thinking, as it actually proceeds - the classical tradition would say here: as it is applied - is anything but 'logical'.

(2) More to the point, it is without foundations (eternal, apodictically certain proofs).-- So what is it?

(1) Working logically amounts to combining (combinatorics; ETM--HARM 145) thought processes into a network.

(2) To work logically is to continually absorb changes, given, inductively, that reality in, and around us (the whole moving cosmos) is in a constant state of change, rise and fall, for example.

The metaphor: as a weaver weaves a follower's net, which floats in the air, so does our "thinking": we constantly "weave" life and world views of all kinds,--also "philosophical systems of thought," which come and go,-- scientific theories, which come and go,-- all of this separate from the "reality (who knows exactly what it is?) Outside of us.

In a multiculture like ours, such a Postmodernism may rely on more than one clue toward the weaving of imaginaries into imaginary networks.

Final sum.—Instead of a solied thinker is man not rather like Konstantijn Guys (1805/1892; Dutch artist) and Charles Baudelaire (1821 1867; *Les fleurs du mal* (Flowers of Evil), (1857)), who knew themselves as uninvolved "strollers" amidst all these changes?

Consideration.

The inductivism that we, since the beginning of the course, have been advocating offers a solution here. Provided, at least, that one does not limit induction to the metaphorical-collective doctrine, but extends it to the metonymical-systemic doctrine (ETM --LOG 237; ETM--LOG 319 (inductive syllogism),--in the Platonic- hypothetical sense (ETM 02).

This means that:

(1) our sentence summaries (ETM-LOG 292) are only samples in the total (collection/system) reality and

(2) our sentence foundations rely only on those samples,-- "founded" on them.

The concept of 'sampling' is the artery of our inductivism. Or, if one wishes, 'sampling philosophy'. We have, admittedly, an immediate intuition of 'collection' and 'system' (we think metaphorically and metonymically).

But the application recalls Platon's method, as we have outlined it ETM--LOG 227 ('theoria'). This always revolves around three main things (ETM--LOG 225 viz. (a) names, terms, concepts, (b) whose contents are clarified in the definition, as far as at given time possible, and whose extent is clarified singularly-concretely, by means of specimens (called 'phenomena',--'pictures' of the 'idea, in Platonic interpretation). - In education this is called the contemplative method,-- where 'contemplation' means direct confrontation with both the specimens and the definition(s).

Practical:

Our inductivism implies, as far as observation, i.e. the sense of meaning, is concerned, that, as a sample, it is always subject to error. Consider the twenty years of "observations" of physicians concerning hydergine (ETM--METH. 332): all these years they either did not observe or observed too little -- erring in either case -- precisely what hydergine did to the sick,-- Our inductivism includes, as far as reasoning is concerned, i.e., the sense that, based on random observation, it is subject to error.

Conclusion.-- Our inductivism is both architectural -- it relies on observations and reasoning (presuppositions) -- and network; it sees through the narrow limits of observation and reasoning of the 'architectural edifice' that is our knowledge, including scientific knowledge.

Herodotean: our 'historia', information-gathering, and our 'logos', text (exposition) are both 'inductive', sample-based.

Ideology Criticism.

This name actually denotes "ideology science" because it describes and assesses - what is called - "ideology.

Bibl. s.:

-- C. Hertogh, *Bachelard and Cnaguilhem* (Epistemological discontinuity and the medical norm concept), Amsterdam/ Berchem, 1986;

-- J.-Fr. Rolland, *Un dimanche inoubliable*, (An unforgettable Sunday), Paris, Grasset.

There are many definitions of 'ideology'. Historically, it originated after Destutt de Tracy's (1754/1836), *Eléments d' idéologie* (1801/1815). In that book, the term means "power, especially knowledge psychology."

We adhere to Canguilhem's definition.

a. There is, concerning knowledge - 'cognition' - first of all what is called "pre-scientific knowledge"

b. Once the sciences have introduced data (information) and "rationality" (reasoning), the pre-scientific element quietly melts away.

Yet here opinions differ.

a. G. Bachelard (1884/1962; epistemologist) sees an absolute break between prescientific knowledge and actual rigorous sciences.

b. G. Canguilhem (1904/1995, epistemologist) sees only a relative break: there is always something pre-scientific and non-scientific within science proper, even rigorous science itself. In short, "ideology" is the preliminary stage of science insofar as it is non-scientific knowledge, "ideology" is at the same time within science what is the preliminary stage of it.

In other words, this is one argument in favor of the network proponents (including the Postmodernists). After all, what is preliminary to science is certainly subject to suspicion, for the reason that it is unexamined.

Jacques-Francis Rolland, *Un dimanche inoubliable* (près des casernes) is a description of ideology collapse.-- Rolland is a former Communist.

The book, a novel, talks about a certain Pierre Mesleau de Die, of bourgeois origin, full however of Marxist ideas. The "unforgettable Sunday" is set in 1943, March. Pierre, for the first time, in Grenoble, takes an active part in an attack.-- But for years he lives through the "death" of his youthful ideology.-- The work received "le Grand Prix de l'Academie Française". -

Such works illustrate, in a literary way admittedly, that even what calls itself "scientific socialism" - the Marxists go big on having merged "science" and "socialism" - is not without ideology.

Sample 44.-- Method theory (direct and indirect (method). (337/344)

Except for a few Early Socraticists, about whom more later, being mentioned:

-- Ch. Lahr, *Logique*, 547 (L'esprit de finesse et l' esprit de géométrie);

-- I.M. Bochenski, *Philosophical Methods in Modern Science*, Utr./ Antw., 1961, 250 (Classification).

First a word about the 'esprit de finesse' (sense of finesse), and the 'esprit de géométrie' (mind of geometry). Lahr derives this systechy from Blaise Pascal (1623/1662; e.g. De l'esprit géométrique (1654)).

(1) Perceptual acuity.

Note that "finesse," in French, can mean. "La finesse de l'ouïe" means "the sharpness, 'sensitivity', of hearing.

Lahr describes: the perceptual acuity sees the data "d' une seule vue" (at once). - If the perception is tentative, then the perceptual acuity adheres to the probable(st), to approximate "beholdings" (intuitions). In that case "il conjecture, il suppose, -- au besoin il devine" (he ferments, supposes,-- if need be he guesses). Hypotheses spring -- according to Lahr -- from the perceptual acuity. Conclusion.-- direct knowledge.

(2) Reasoning mind.

Note: In French, e.g., "esprit géométrique" means "rational thinking." -- Deducing - according to Lahr - characterizes the reasoning mind.

Conclusion.-- indirect knowledge.

Note.-- Following in Pascal's footsteps, Lahr argues that both together really make up knowing.

Note.-- Francis Bacon of Verulam (1561/1626), in his *Novum organum scientiarum* (1620), in which he proposes a thorough reform of scientific work, typifies what Pascal (Lahr) says as follows.

(1) Empirical method.

The Empiricists -- a type, mainly Anglo-Saxon, of Enlightened-Rationalists -- resemble ants: they confine themselves to accumulating loose data.-- Think of Herodotos's historia, the collection of data.'

(2) a-priori method.

The Apriorists -- another type of Enlightened-Rationalists,-- in the wake especially of Descartes -- resemble spiders: out of their own minds they weave beautiful webs (theoretical views), detached from the empirical data. Think of Herodotos's logos, the drafting of a closed account (text formation).

(3) experimentalist method.

The Experimentalists - Bacon said, - resemble bees:

a. from flowers they obtain honey,
b. from their own being they manufacture nectar from it.

Conclusion.-- The experimentalist -- at least the real one -- combines observation (data) and reasoning (closed text). This is how real science builds itself.

Father Bochenski's opinion.
Direct methods of knowledge - among which Husserlian Phenomenology occupies a place of honor - exhibit, Bochenski argues, two aspects:
a. The spiritual "beholding," (i.e., sense-making);
b. The description (if necessary, narrative) of the "watched" (meaninginterpretation).
Note.-- One can add modeling, e.g., in computing: there, too, a. there is "viewing" of data, b. which are "described" (displayed) in the "model. - The indirect methods fall into two major groups.

1. Language analysis.
Because of the very large role that language plays in just about every science - think terminology -, language analysis is an absolute necessity.

In passing: revisit ETM--HARM 84 (logical syntax), esp.98/105 (Sign and model). Revisit ETM--HARM 94 (language systems: formalization); 145 (combinatorics).-- Bochenski also calls such methods "semiotic methods" (o.c., 45/89).

2.-- The reasoning methods.
Here Bochenski distinguishes two main types.
a. The deductive method.
b. The reductive method.

Note.-- Bochenski relies on William Stanley Jevons (1835/1862; The Principles of Science (1874, a treatise of logic) and especially on Jan Lukasiewicz (1878/ 1956; Aristotle's Syllogistic (1951)). These distinguish two main types of indirect knowledge.
The deductive type: if A, then B; well A; therefore B;
The reductive type: if A, then B; well, B; therefore A.

Both reasonings put the principle of sense (principle of necessary and sufficient ground) first (ETM--LOG 300),-- expressed in the first preposition: "if A, then B (intelligible, explained, justifiable): But in the deductive case the preposition ('analytic' reasoning, in Kant's parlance) is realized; in the reductive case, however, first and foremost the postposition is realized and in the conclusion the preposition is sought,-- as a hypothesis for explanation.-- Which Platonically amounts to forward and backward dialectics (ETM--LOG 300).

In our language "we adhere to the traditional dichotomy, de- and induction (ETM--LOG 318/319).

The comparative (comparative) method.

Comparing plays the basic role par excellence. After all, not only does the scientist compare the data among himself (object-bound comparison), but he constantly compares the observed with his own representation of it (subject-bound comparison).

A.-- Internal and external comparison.

This we set out ETM--HARM 131/134.

B.-- comparative method.

This we have set forth ETM--HARM 185/194.-- Add to this ETM--HARM 195/201 (Assimilism/ Identivism/ Differentism). For there are obvious emphases in comparing.

Note 1 Why do we situate the comparative method here in direct knowledge? Because - as e.g. Ch. S. Peirce already noticed - in our perception comparison is already present. One sees e.g. a hare running: who does not see at the same time the whole trajectory? One should already use some Eastern meditative method in order to sit, e.g., on a green wall 'looking' ('staring') for hours so that one only perceives, i.e., without comparing with the rest, e.g., oneself.

One may question whether this one-pointed "meditating" is ever truly realizable. Not to mention the mutilation of the natural totality of all perception, which is inevitably at work in such methods.

Peirce calls this the perceiving of 'a first' (= a first given),-- which, in his view, is immediately accompanied by 'a second' (= a second given),-- and what surrounds the first as well as 'a third' (= a third given), namely the fact that I/you/we,-- it/they perceive the first (and the second) given.--

Thus, in Eastern mystic meditation, it would be possible to perceive purely a first datum (through hyperconcentration on it) without immediately perceiving the second and third datum.

Remark 2 Why do we situate comparison also in indirect knowledge? Now reread ETM--HARM 209 (the method of logic) for a moment. Judgment presupposes a minimal comparison between the original (subject) and the model (saying). Reasoning presupposes--whether it is (explicitly) syllogistic or not--the simultaneous thinking comparison of at least two thought contents.

Appl. model.-- Let us take the thinking model of Jevons-Lukasiewicz. "If A, then B. Well A. So B." One cannot possibly accomplish such a reasoning without having A and B in the mind at the same time and ... comparing them!

The antique Greek run-up to 'metatheory'

Bibl. s.: I.M. Bochenski, *Philosophical Methods in Modern Science*, Utr./ Antw., 1961,77v, (Semantic Stages).

A.-- Situation.

Now reread ETM--HARM 98vv. (Semiotics). The second aspect that the theory of signs brings up, after syntactics, is semantics, which talks about the relation between signs--e.g., a sentence, which I think (in Peircian language: a thinking sign) or which I utter (Peircian: a speaking sign) or even write down (Peircian: a writing sign),--e.g., a whole theoretical text--and a reality indicated by it,--this for pragmatics.

B. -- Meta-language, meta-theory.

Note.-- For comparison.-- Intentionality theory.

(a) Already before and with Platon

Already then, there is what has been called 'intentio', consciousness orientation, since S.Augustine of Tagaste (354/430; greatest church father of the West) and the Scholastics (600/1450).

The sentence "I see that squirrel over there poking out" implies (involves) a direction of my attention -- away from me to that squirrel and its pursuits. This is what the Scholasticians called "intentio prima" (first, natural attention orientation).

The sentence "I realize (am aware of, give attention to) that I see that squirrel picking out" involves a turn of my attention (awareness, consciousness) away from the busy squirrel to my seeing it. This is what the medieval thinkers called "intentio secunda" (second attention orientation),

The sentence "I try to see through how I see the busy squirrel and also how I realize that I see it, in a theory about it" involves an "intentio tertia" (a third, this time theoretical attention orientation).

(b). The three semantic stages.

A little example clarifies immediately.

1. Semantic zero stage.

"I see that squirrel over there picking out a pine cone;" -- In speech, this is called "direct speech" ("speech" here means "use of language") Cf, first "intentio".

2. First semantic stage ('object language').

"I pronounce -- to denote the seen and the seeing of it -- a sentence (a set of signs): "I see that squirrel over there, etc."-- Spoken: a first lateral (indirect) speech.-- Among semioticians, 'object' in the term 'object language' means "the signs used. -- Cf. second 'intentio'.

3. Second semantic stage ('meta-language').

"I am trying, in a theoretical reflection, to understand that and how I pronounce the sentence (a set of signs) to indicate that I see a squirrel busy, etc."

Spoken: a second lateral speech (i.e., a series of sentences (sets of characters) over a sentence (a set of characters)).

Semiotic: "I construct a meta-language, a language about the language about the things denoted by that language." A language about the "object" (the signs).

Immediately the term 'metatheory' is also clear: "a theory about theorizing". That would be a further degree of meta-language, for I do not only theorize but I theorize about my theorizing! So far an introduction.

1.-- The antique Greek term 'sophia',

'Wisdom' we translate.-- But what exactly did ancient thinkers understand by it?

The (in)direct method.

The 'sophos', Lat.: 'sapiens', directs his 'noble yoke' (Platonic term for 'intentio', attention (direction)) towards "the being", all that is even slightly 'real'. - The first thing to notice is 'ta fainomena', the phenomena, the 'phenomena', that which shows itself to be direct, immediately receptive (sense). - The second thing that stands out is the explanation of the phenomena. Platonic: from what premises do the phenomena become intelligible?

As an aside, now reread ETM--METH 325 (material object) and 326 (formal object).

Note -- What is striking about this -- and this is one of the most profound differences from current thinking, which has emerged since Moderns Rationalism -- is that the Ancient thinkers always aimed for some kind of theory of happiness (eudemonology (soteriology)) in their theorizing.

'Virtue' - understand: the conscientious life - was central,-- and this as the source, main premise (hypothesis) of happy living. And, as W. Jager, Paideia, once made abundantly clear: 'wisdom' (understand: philosophy) was always health and education. - Cfr. ETM 06 ('healing science')

2. a. Xenophanes of Colophon (-580/-490).

Bibl. st.: W. Röd, *Geschichte der Philosophie*, I (Die Phil. der Antike 1 (Von Thales bis Demokrit)), Munich, 1976, 75/82 (Xenophanes).

"Metatheoretische Einsicht" (metatheoretical insight) Röd very explicitly attributes to Xenophanes.-- "Xenophanes was apparently not concerned with justifying a skeptical (note: understand: radically doubtful) position.

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He wanted to clarify the relationship between perceptual knowledge and rational understanding in the form of a theory." (O.c., 79/80).

In other words: Xenophanes saw the problem of the direct and indirect method. Or in other words: the distinction between certain, because based on direct observation, knowledge and 'opinion', indirect knowledge.

Appl. model.

Note.-- The term 'Iris', among the Antique Greeks, meant both the natural phenomenon 'rainbow' and the goddess, thought to be associated with that phenomenon. Perhaps for the reason that a rainbow connects 'heaven-space' (dwelling of one type of deities) and 'earth', the goddess Iris, otherwise revered by no religion, was interpreted as the messenger - in Biblical language 'angel' - because of the deity world.

See here how Xenophanes speaks of it.-- "What the mass is called 'Iris',-- that too, according to its 'fusis', nature, considered, is only an aerial phenomenon which, when observed, shows purple and bright red and yellow-green colors" (Fr. 32).

Note.-- If we correctly interpret the term 'fusis', Lat.: natura, nature, Xenophanes here means "reality perceived without religious interpretation". Which, since Thales of Miletos (-624/-545; founder of 'natural philosophy'), is one of the meanings of the term 'fusis'.

Or: sense conception,-- not sense foundation. Direct, immediate interpretation,-- not indirect, mediate interpretation.

Appl. model.-- Fr 35: "These data being suggested ('dedoxastho, as mere opinion recited), -- as somewhat approximating original reality ('etumoisi eoikota')." Xenophanes' own opinion he himself denotes as "etumoisi (= fusei) eoikota", as merely approximating.

The term 'eidenai', usually translated by 'knowing', means -- according to Röd, o.c., 80 -- "direktes Wissen,-- beobachtet haben" ("direct knowing, - having observed it"). Which differs from 'dokos'-- think of the later 'doxa' in a Platon e.g. -- which means 'opinion', indirect knowing.

Conclusion.-- The base is 'eidenai' (what provides the original in a judgment); the superstructure is 'dokos' (what, in a judgment, provides the model).

Indeed: Xenophanes has a "theory" about what the Greeks, as a mass, say (object language) about things (semantic zero stage).-- Two features stand out to him:

1. The ambiguity (there are, concerning one phenomenon, many opinions);

2. Progress (tireless search work ('zètountes') bestows better interpretations under divine guidance).

2.b.-- Alkmaion (= Alkmeon) of Kroton (-520/-450).

Bibl. s.: A. Kremer Marieth, *Alcméon de Crotone*, in: D. Huisman, dir., Dict. d. philosophes, Paris, PUF, 1984, 43;

-- J. Zafiropulo, *Empedocle d'Agrigente*, Paris,1954 99ss.;

-- W. Röd, *Die Philosophie der Antike 1* (Von Thales bis Demokrit), Munich, 1976, 71/73

J. Zafiropulo writes: "Alkmeon, the great physician of the 'sect' of Kroton, whose fame was splendid at the time: Kroton is the city where Puthagoras of Samos (-580/-500) ended up. So Alkmaion may have known him.

Alkmeon was first and foremost a physician, and he did come from an independent tradition of healing that connects to Dèmokèdès (Lat.: Democedes) of Kroton - pythagorean physician he apparently was:

a. like the Paleopythagoreans, he interpreted health as 'iso.nomia', 'equal justice', ('harmonia', right fitting together) of 'dunameis', life forces (ETM 05), among other things expressible in systechies as e.g. "moist/dry", "hot/cold", "bitter/sweet";

b. like the Paleopythagoreans, he designates the human soul as an immortal being, -- yes, as "divine" to some extent, since it "moves of itself" (i.e. is not slow (inert) like (dead) matter).

Alkmaionic theory of knowledge.

Röd, o.c., 72, emphasizes: "In Alkmaion's epistemology, a sharp distinction is made between 'aisthanesthai', direct knowledge, and 'xun.ienai', indirect knowledge.--Alkmaion, in Paleopythagorean spirit, sees a rank:

a. The animals possess direct knowing, but not 'xunienai', indirect knowledge;

b. Humans possess the two: human knowing is twofold,--and perceptual knowledge and interpretive knowledge. Cfr Fr. 1a.

c. The deities, however, "see" directly and with complete certainty.

Semeiology.-

As a physician, Alkmaion was by profession a "semeiologist," i.e., interpreter of symptoms, "tekmeria.

The interpretation of signs (ETM--HARM 98/105) is typical doctor work. Supposedly, a woman has hurt her leg.

a. Knowing it directly: the encumbrance may be physically visible (redness, swelling); it is accompanied by the complaint;

b. Knowing indirectly: is it an ordinary sprain? Is it a real fracture of the leg? Here deity and humanity diverge: a healing deity sees directly,--what she communicates to a healer, e.g., by inspiration.

Opm.-- The rhetoric.

Antique rhetors, in their textual theories, apparently drew on the Pre-Socratic traditions of a Xenophanes and an Alkmaion.--Read on this subject ETM--LOG 292v. (direct and indirect proofs).

Note.-- We briefly connect, to what we ETM 02 (given/requested) briefly touched.-- Still today -- especially with problem-solving mathematicians -- the distinction applies:

a. What is immediately given? (immediate knowledge);

b. What has been asked? (indirect knowledge).

This second is done by reasoning.

Conclusion.-- Bibl. s.: S.L. Kwee, *Philosophy of science,* in: C. van Peursen/ S. Kwee, ed., Way into the sciences, I (Physics, biology, psychology, sociology, linguistics, history,-- philosophy of science), Rotterdam, 1966, 110/126.

Kwee characterizes science starting from the concept of process (in ancient Greek: kinesis; Lat.: motus). This entails that Kwee defines narrative, storytelling.-

A. The data.-- Here is where a Herodotos comes in: data -- according to Kwee -- is traced. What Herodotos calls "histrionics," inquisitio, search work. The question - says Kwee - is "how do I get my data?".

B. Data processing.

With Herodotos: 'logos', text.-- According to Kwee, this proceeds in two ways.

b.1. The identification - verified by the search work - of the data.

b.2. The arrangement of data, preferably within a scientific system.-- This answers the question, "what do I do with my data?".

Conclusion.-- "It is, in science, about this insight" (o.c., 115).

An application.-- Bibl. s.: Wilfr. Daim, *Tiefenpsychologie und Erlösung*, (Depth psychology and redemption), Wien/ Munich, Herold, 1954, 18/23 (Drei Methoden).-- The author wants to solve especially deeper psychological problems,-- using as a background the Biblical concept of "redemption" (the psychologist,-- neurologist/ psychiatrist, psychotherapist, "redeems" as it were the patient(s). -- He sees the method as threefold.

A. Phenomenological.-- Direct knowledge is recorded in description/story.

B.1. Hermeneutic ("verstehende Methode," ETM--HARM 135/139).

The first degree of indirect knowledge based on the 'expressions' of the patient(s).

B.2. depth psychological.-- The second degree of indirect knowing: the "expressions" are examined down to the unconscious and subconscious.

Sample 45.-- Methodology (the phenomenological method). (345/354)

We now dwell on one method.

Bibl. s.: File.-- *Husserl-Archive at Leuven*, in: Academische Tijdingen (13/14)/ Alumni Leuven (22 (1988): 13/14 (22.04.1988), -- which briefly outlines how the legacy of ETMund Husserl (1859/1938; one of the greatest founders) arrived in Leuven;-- it comprises some 40,000 pages;

-- W. Biemel, Hrsg., E. Husserl, *Die Idee der Phänomenologie* (*Fünf Vorlesungen*), Haag, M. Nijhoff, 1950.

Note.-- Frayed to its extremes, Phenomenology is a very diverse movement. Here we confine ourselves to a mere introduction.

The "intentionality".

Now reread ETM--METH 339 (Intentionality Theory).-- Indeed: the focus of our consciousness on either the realities outside us or the realities within ourselves is central.

In passing: one can also express this in another way: the 'encounter' of ourselves either with the outside world or with ourselves on the basis of that orientation is the essence core of the Phenomenological method.

Note.-- At our place, e.g. Fr. Buytendijk (1887/1974) is someone who used the concept of encounter - in the sense of personal-direct confrontation or acquaintance with something - as the main concept (Cfr F. Buytendijk, *Encounter*, in: Tijdschr.v.Filosofie (Leuven) 51 (1989)/ 1 (Mar): 1 107/113).

Note -- Ch. Lahr, *Psychologie*, Paris, 1933-279 113/125 (Diverses théories relatives à la perception), talks about mediatism and immediatism.-- A mediatisist puts forward that we perceive reality indirectly, 'médiatement', (= mediately). An immediatist, however, puts forward that we grasp reality 'immediatement' (= immediately, without any intermediary of any kind), directly thus -- (to speak with Buytendijk) 'encounter' it.

There are valid arguments for the two views. What is certain: the Phenomenologists hold mainly, if not exclusively, to immediatism: we encounter thanks to our intentionality (consciousness openness, referredness) - directly the things in and outside of us. We "are directly with the data itself." This is one of the basic axioms of the Phenomenological method. In other words, the tendency of the Modern Rationalists, since Descartes and Locke, to always think from our "inner self" is over, as if a sort of "bridge" had to be built between us and "the world".

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The Austrian School.

Bibl. s.: H. Arvon, *La philosophie allemande*, (German philosophy), Paris, 1970, 133ss. (L' Ecole autrichienne).

a. Distant predecessor was B.Bolzano (1781/1848 (ETM--LOG 298)), known for putting concepts, judgments, reasoning "in themselves" first. Bolzano came away from Modern !psychologism" concerning logical entities,

b. Franz Brentano (1838/1917) was the founder in the proper sense. Known for: *Psychologie vom empirischen Standpunkt* (Psychology from the empirical point of view), (1874). The point of view of such an 'empirical' psychology was - not the so-called causal or causal explanation of psychic phenomena but - the description of the psychic phenomena as phenomena. I.e.: insofar as they are immediately given. More narrowly defined: 'phenomena' here are so-called acts, as e.g. the act of imagining a person who is walking. Hearing, seeing, remembering,--judging and reasoning,--experiences (e.g. joy) Brentano calls 'acts'.

Counterparts of such an act he calls '"physical phenomena" - so e.g. colors, people, landscapes -, which are objects of acts.

Conclusion.-- Following the Scholastic (800/1450), Brentano here introduces the term 'Intentio', consciousness orientation. Seen this way, every 'act' is 'intentional' i.e. directed to a given (object).

He defines consciousness as an orientation of an "I," (subject) to an "object.

Note.-- Brentano already practices a kind of 'phenomeno.logy', phenomenon description, which is limited to the representation of phenomena (apart from the fact whether they exist, yes or no, independently of their consciousness 'in themselves'. Suffice it to say: the experience, with its mere focus on 'something', (inside or outside the experience).

Note -- Others have expanded on this basic intuition of Brentano. Thus Alexius Meinong (1853/1927), known for his *Gegenstandstheorie* (another name for phenomenal description);-- Carl Stumpf (1848/1936);-- the most famous is ETMund Husserl (1859/1938), the founder in the narrower sense of Phenomenology, which had its flowering especially immediately after WW II (1940/1945) and which culminates, among other things, in existential phenomenology (M. Heidegger e.g.).

Note.-- The term "phenomenology" dates from J.H. Lambert (1728/1777).

G.Fr.W. Hegel (1770/1831) published his *Phänomenologie des Geistes* (a kind of cultural philosophy) in 1806. P. Teilhard de Chardin (1881/1955, the evolutionist, worked out an evolutionary 'phenomenology'.

Note.-- A work by John R.Searle (1932/...), philosopher of language (Berkeley, Cal.), appeared in French, namely L'intentionnalité (Essais de philosophie des états mentaux), (Intentionality (Essays on the philosophy of mental states)), Paris, Ed. de Minuit, 1986: the acts of language are to be interpreted as one kind of intentional acts.

Mistake to be avoided.

More than one thinks of intentions when they hear the term "intentionality. Intentions, in this phenomenological language, are only one type of intentional act. Every psychological phenomenon is 'intentional'. So e.g. the understanding, in which I have a mental representation of an object, with which I focus on that object. So the judgment: it is an act of affirming or denying, restrictively or not, of a given, to which I direct my attention. That is cognitive, 'intentio'.

But there is also volitive (axiological) 'intentio': I love someone while focusing on them, e.g..

Note.-- According to Brentano, no "physical object" is gifted with intentionality: only man is "open" to reality, within or without him.

Phenomenology and (phenomenological) psychology.

In a single first degree, any phenomenology is "science of the phenomena of consciousness." In Latin, "cogitata qua cogitate" (Cartesian expression: that of which I am conscious as far as I am aware).

Note.-- In a not very successful use of language, one also says that phenomenology is "science of immanent phenomena". 'Immanent' means "all that is situated within something", so e.g. our consciousness as interiority. That term is really good, insofar as one does not forget that phenomenologists (esp. of the Austrian School) are immediatists, of course.

In other words: purely mental acts - however inner - always issue from 'something' (an 'object'), even if it were a fantasy or a daydream or something absurd. This does not prevent one from working out, in the line of Brentano e.g., a mere ("empirical" or not) psychology, which is limited to such an "immanent" product of consciousness.

But then such a mode of description does not reach the level of true philosophy. It is and remains positive science. Even if it is then with a 'phenomenological method'. As e.g. A. de Waelhens (1911/1981; Belgian phenomenologist) remarked: a psychological novel can, as the case may be, contain a lot of empirical phenomenology, because the author of it represents the life of the soul in an 'object-oriented' way.

Cfr. A. de Waelhens, *Existence et signification*, (Existence and meaning), Louvain/ Paris, 1958,-- o.c. o.c., 233/261 (Sciences humaines, horizon ontologique et rencontre).

-- See also S. Strasser, *The concept of soul in metaphysical and in empirical psychology,* Leuven/ Nijmegen, 1950;

-- Alexander Pfänder (1870/1941), *Phänomenologie des Wollens* (1901; Pfänder, about the same time as Husserl, adopts the term "Phänomenology");

-- id., *Einführung in die Psychologie*, (Introduction to psychology), Leipzig, 1904,-- in which he notes four main meanings of the term "consciousness.

a. self-consciousness, b. awareness of something (= intentional character),-- c. all that is psychic (= psychology of consciousness),-- d. the psychic subject (the self-conscious, I).

Point c is strongly disputed by the Depth Psychologists, among others.

Situating the psychology of consciousness.

Resuming ETM--HARM 145v. (Differential of psychologies).-- To the left of the configuration is 'introspective psychology' Cfr. ETM--LOG 211 (The skilled introspective method),-- 267 (Self-knowledge).

Fundamentally, every Phenomenology is a theory of perception, which limits itself, educated - method-consciously to what one actually and directly perceives (putting the rest 'eimgeklammert' in parentheses,),

Consequence: it is the presupposition of every possible theory of perception.

Appl. model.-- Joh.Wagemans, *Looking and seeing at first sight* (The psychology of perception taken a closer look), in: Streven 1990: May, 712/725.

The article deals with the three last perceptual learnings,-- the Cognitive (schema: information - information-processing subject - processing release), the Ecological (schema: information in the context of the landscape - information-processing subject - release), the computational (mimicry by computer tools of human perception; cfr. ETM -- LOG 269 (Neuron Networks))

Take a practical example;

Bibl. st: Fr. Joignet/ P. van Eersel, Visions.-- *Le Chaos par Prigogine*, in: Actuel 1990: oct., 91/93.

The text begins as follows: "During an icy morning in the winter of 1961, Edward Lorenz (ETM--HAR 169), highly gifted mathematician, makes his way to his laboratory at M.I.T., the famous Institute of Technology in Boston. But he does not yet realize that he is about to enter "chaos." For, since World War II, he has been digging into meteorology.

That day he becomes fascinated by an order of numerical simulation - of the development of a climate. In the silence of his laboratory, he rehearses on his ordinator - an old Royal Mac Bee - the data concerning the climate to be studied. (...). LoreAS could not believe his eyes: the course of the new curves, far from obediently repeating the old model, was moving away from it! At first, a few millimeters. Later, the ordinator draws "the craziest figures". The new climate, shown in the simulation, has nothing to do with the predictions".

As an aside, LoreAS discovers the Butterfly Effect in this way.

Phenomenological assessment.

Consciousness psychology 'takes' Lorenz to 'observe' what? The curves, numerical representation ('simulation') of a climate-in-evolution! He thinks, through what he consciously-psychologically perceives, of that which is represented (simulated).

But that is indirect method. To direct method is present only the moving curves on the screen. The rest is interpretation, indirect knowing.-- One can, of course, metaphorically, speak of "direct observations of the weather." But then one expresses oneself in a picture-speech form.

Conclusion.-- However one turns or turns it, in consciousness psychology hostile or septic-minded environments : what consciousness psychologists uncover is always the first observation. On which all other "perceptions" build. In this well-defined sense - we said above - consciousness psychology is the presupposition of all other theories of perception.

Phenomenological "consciousness" and cognitivist "consciousness.

Imagine a twofold scenario.

A. Lorenz has fallen asleep at his ordinator in operation: his 'consciousness' of the curves on the screen is 'zero'. Unless one says, by stipulative definition, that his 'consciousness', fallen asleep from fatigue, is still "with the device" somewhere.

B. Comes running up there a child looking from Lorenz to the working screen. It perceives the curves. It has a "Phenomenological awareness" of the curves.

C. Lorenz shoots awake: he also perceives the curves, but has a different 'consciousness' of what those curves tell him, -- a 'consciousness' that the child does not have (it does not realize what those moving lines mean),-- in cognitivism one can call that a not merely 'phenomenal' (merely dwelling on the phenomena) 'consciousness'. Matter of definition, of course.

Phenomenology as description.

As P.I.M. Bochenski says very correctly (ETM--METH 337), phenomenology, in whatever interpretation, exhibits two aspects:

a. spiritually, i.e., with the mind, beholding (direct perception, "intuition"),

b. representation (description, story) of the 'beheld'

In other words, to "describe" is to "represent how the world and our life in it shows itself to our 'I' as a meeting point of psychic experience" (according to Husserl).

In M. Heidegger's language: "The uttering (= articulation) of what 'phenomenon' is" (*Sein und Zeit*, I, Tübingen, 1949-6, 27/39).

Gerhardus van der Leeuw, *Phänomenologie der Religion*, Tübingen, 1956-2, 768, says: "The phenomenon is something that shows itself,--precisely because of that it shows itself." In particular: within consciousness!

Conclusion.-- Phenomenology is the bringing up of phenomena insofar as they are displaying data ("information").

'Egology'.

'Ego' in Latin means 'I,' 'Egology' is a barbaric word formation for "bringing up the self." I-science.

That this is so is apparent when one compares a Positivist description or a Marxist description with a Husserlian one.

The Positivist describes, in unity with the discerning community, what is describable within positive-scientific objectives.

The Marxist describes, in unity with a certain socioeconomic class, what is reflective of reality within Marxist intentions.

Both forms of description, however, when relying on direct observations, describe like the egologist Husserl. What I, Auguste Comte, personally perceive,--that I reproduce (Positivism). What I, Karl Marx, personally perceive,--that I reproduce (Marxism).

That in which Comte and Marx differ from Husserl, is, in Husserlian interpretation, already interpretation, - not a direct representation of data showing itself to the 'I' of Comte or Marx.

This is apparent when one Positivist differs from another when merely describing. This also appears when one Marxist differs from another as a mere descriptor.-- Again: Phenomenology, certainly in the Husserlian sense, is at the beginning, as a presupposition, also of Comtian or Marxist so-called 'objective', 'matter-of-fact' representations. Everything passes through the conscious 'I' which is directly confronted with data, 'phenomena'.

Phenomenology as a science directed "zu den Sachen selbst". (to the things themselves), Egology, yes, but also matter-of-factness, -- that's Phenomenology.

Consequence: like its distant predecessor Bolzano (ETM--METH 354), e.g., Husserl is not a, "psychologist. Not all realities,--not all reality is reducible to mere psychic phenomena. Which would be a kind of 'reductionism' ('reductionism' here means "the tendency to smooth out several things into one type of it," one of the possible forms of Assimilism (ETM--HARM 195)).

Already immediatism points to this: the object, "die sachen selbst," is central,--though provisionally absorbed within its intentional consciousness directed toward that object. Precisely because of this, Phenomenology, though somewhere psychological and mother of one kind of psychology, is no mere psychology.

Two "reductions" (understand : eliminations that are simultaneously suspensions).

Do not confuse the term "reduction," in Husserlian language, with the same word-sound, in mere logical language.

A. The phenomenological reduction.

Husserl 'reduces' - reduces, reduces - the whole given, the whole object, to what of it shows itself in the consciousness of it.

App. mod. - Think of LoreAS's computer: what the child, with him, perceives on the screen, that is left over from the whole weather. The rest is 'eingeklammert', (put in brackets). The judgment of that rest, which is not 'phenomenally' perceptible, is suspended ('epochè').

Appl. model.-- Husserl, in his study, looks at the electric light. What his "I" perceives of it directly, that is the phenomenal part. The rest, e. g. that electricity is a flow of electrons, he puts "in brackets" (he suspends judgment on that), because he does not perceive that directly.

B. The eidetic reduction.

The whole object undergoes a second reduction, namely only the general concept (ETM 30: universal concept) or also the comprehensive (transcendental) concept (ibid.), present in it, is preserved. The rest, this time all singular attributes, is "put in brackets".

With Platon -- though differently -- Husserl uses the term "eidos" (with the adjective "eidetic") for this purpose: through the eidetic reduction, of the whole object only the general and/or the transcendental understanding is left. For the moment, the individual does not count.

Some aspects of phenomenological reduction.

What, if anything, can be "put in parentheses" to prepare the pure phenomenon freely.

A.-- On the side of the self.

E. Husserl, *Die Idee der Phänomenologie*, (The idea of phenomenology), The Hague, 1950, 44, says, in his sophisticated language, that the self, insofar as it does not show itself directly -- e.g., as a 'given' in the midst of other things in the external world,-- e.g. as independent person(s),-- yes, as the not immediately evident source and seat, of psychic acts (ETM--METH 345) - must be radically 'switched off' such that "only what the given is in itself" (o.c.,44) is drawn bare in a description.

This, notwithstanding R.A. Mall, *Experience and Reason* (The Phenomenology of Husserl and its Relation to Hume's Philosophy), The Hague, 1973, emphasizes that reflective (looping, self-knowing) consciousness is functioning while the description is taking place.

I.M. Bochenski, *Philosophical Methods in Modern Science*, 32v., specifies this.

a. The so-called subjective is, first of all, all that obscures the purely cognitive, i.e., the sense-making concerning what is immediately given.

As an aside: according to the proposer, this recalls, somewhat, what Antique Greeks call "theoria" (ETM--LOG 227), the perception attuned to the pure throughness in the immediately given.

b. The "subjective" is, further, all that is practical and/or pragmatic. It remains with the pure, value-free description,--without any additional practical or result-oriented intentions.-- Which Bochensky does not consider to be so easily achievable. After all, we all - sometimes unconsciously or subconsciously - have our value judgments, such as opposing an opinion, preaching something, finding the object uninteresting or unsympathetic.

This does not prevent a Phenomenological psychology from remaining possible, as we have already explained (ETM--METH 346): any psychic experience--experience, perception (hate, love,-- expectation, reluctance,-- soccer enjoyment, art experience)--can become object of direct pure contemplation (dwelling on, giving attention to,--reflective, introspective). Cfr. Die Idee d. Ph., 31, 45.

Note.-- This somewhat corresponds to Peirce's elimination of the idiosyncratic method (ETM 12).

B.-- On the side of the property.

Again, some reductions need to be made.

1.-- The elimination of extra-intentional 'existence'.

Whether it is the description of:

a. absurdity,

b. fantastic (the phantasms of Psychoanalysis e.g. or those of science fiction or Postmodern network fictions or also of what is called "the fantastic literature"(about werewolves and vampires e.g.)),

c mathematical e.g. (the 'data' is an object of very precise intentional approximation: whoever does not perceive the mathematical data exactly, starts wrong) data - we do say 'data' applies, intentionally, i.e. within the Phenomenological attention, they certainly exist. Otherwise we cannot even think about them!

The descriptive Phenomenologist, however, suspends judgment concerning anything other than 'intentional' modes of existence. - Everything has an essence linked to some 'existence' (ETM 33), whereby the term 'existence' is to be understood in the strictly ontological sense, i.e. as a word for all possible forms of 'existence'.

2.-- The elimination of lore (tradition).

'Lore', here is "all that others than the phenomenologist with his descriptive self have or had to say about the object.

This recalls what Peirce calls "rectitude method" (ETM 12). Cfr. the authority argument (ETM--LOG 305): anyone who, impressed by the rejection of Galileo, who possesses enormous authority in natural-scientific circles, would refuse as a Phenomenologist the representation of e.g. astrological belief, commits an error of perception: astrology as a business exists (and that is Phenomenological enough).

In the *Odyssey* (-900/-700) in X: 305 there is mention of 'molu' (Lat.: moly), the gift of the god Hermes to Odusseus to protect himself from the sex magic of the sorceress Kirke (Lat.: Circe): a black root (dark like the Earth Goddess) crowned by a flower reminiscent of 'milk'! Whether that mythical fact is ridiculed by Rationalist-Enlighteners or not leaves the real Phenomenologist unmoved: he describes without question.

Note.-- S. Thomas Aquinas (1225/1274; top figure of High Scholasticism) is quoted by W. Jaeger, *Humanisme et theologie*, Paris, 1956, 112, as saying, "Whatever the true facts in these matters may be, we are not much concerned about them. Reason: philosophy as an inquiry serves not to find out what "men" say, but rather "qualiter se habeat veritas rerum": the true facts of things (S.Thomas Aquinas, Expositio in libros Aristotelis De coelo et mundo, Romae, Editio leonina, lib. I, lect. 22, n. 8 (p. 91).

From the side of the Renaissance and even more from that of the Enlightenment-Rationalists, the Middle Ages are blamed for being "dark ages", among other things and especially because they think, so to speak, in a "traditional" and "law-abiding" way. No one less than a Werner Jaeger, who one can hardly suspect of being biased (he was a Protestant), thinks he has to quote this text in order to break the image that has been ascribed to the Middle Ages.

The "image," the image impression, is one of the disturbing factors that the true Phenomenologist intercepts in its subtle-insidious operation.

3.-- The elimination of theory.

By this one understands - according to Bochenski, o.c., 29) - "hypotheses, proofs, and knowledge acquired from elsewhere (op.: than the intentionally present object)". On this we can be brief after what we have seen ETM--METH 329/335 about the theory.

The only 'theory' -- without theory there is no science (and Phenomenology invariably wished to produce 'scientific work') -- which is valid and deemed applicable, is this which we are now ending.-- but note carefully: Phenomenology identifies itself as the beginning. -- "(With the provisional elimination of all theory concerning the object) the Phenomenologists do not at all wish to deny the value of indirect knowing: they consider it permissible. But only after the phenomenological foundation.

It constitutes the absolute beginning and motivates, among other things, the validity of the rules of inference." (I..M. Bochenski, 35).

As an aside, this recalls law Peirce says about the preferred method (ETM 14): any theoretical "a-priori" interferes with the pure reception of the very fact about which it theorizes.

The most individual perception! The 'intentio' peculiar to the 'I' of each one of us.

Consequence: in being: What is Phenomenology? de Waelhens, himself a phenomenologist, said that the answer to that question is "very controversial." Even it is usually very difficult to make out what precisely a phenomenologist understands by 'phenomenology.'"-- said de Waelhens.

Conclusion.-- Dialogue is the only way out.

Sample 46.-- Methodology (the computational or formalism method). (355/363)

Bibl. s.: I.M. Bochenski, *Philosophical Methods in Modern Science*, Utr./ Antw., 1961, 51/55 (Formalism).

"One of the most important results of Modern methodology is the insight that an 'operating' with the language on a syntactic level can substantially facilitate thinking. Such an 'operating' is called 'formalism' ". (O.c.,51).

The semiotic "pedestal".

Preposition of formalistic operations (operations) is the tripartite division, peculiar to semiotics. For which we refer to ETM--HARM 84/85 (Logical syntax, semantics, pragmatics); 98vv. (The three semiotic aspects).

The formalizing method is situated in the first aspect, syntax,--with parenthesis of semantics (the reference to something outside the signs themselves) and pragmatics (the employment with a view to results to be achieved of signs).

The combinatorial "pedestal".

Second basic premise of computational proceeding is "combining". For this, see ETM--HARM 144 (configuration) and 145 (combinatorics).

'Configure' is:

(1) think together at least two sets and/ or systems

(2) such that one collection/system includes at least one place and the other collection/system includes at least one data to be placed.

Note.-- This reminds strongly, very strongly even, of what Antiques called 'stoicheiosis'. Cfr. ETM--LOG 244v. (the platonic stechiotic method).

Note.-- The stoichiotic method which is one possible form of combining separate elements did not fall out of the sky.

Already Anaximenes of Miletos (-588/-524; the third of the Milesian thinkers of nature) denotes the essence of fusis, natura, nature, as 'aer', (air) and/or 'pneuma', Lat.: spiritus, breath of life - in his parlance: air as primal substance (a fine material reality) or breath substance -, primal substance which either condenses ('puknosis') into liquid and/or solid substance or dilutes ('manosis') into fire substance (Cfr. Röd, *Von Thales bis Demokrit*, 46). Qualitative jumps are explained according to quantitative, better: combinatorial, changes ('operations'). Cfr. ETM--HARM 154vv. (Quantitative change/qualitative jump).

Also Alkmaion of Kroton (ETM--METH 342) uses the term "krasis," as does the later Parmenides of Elea (ETM 08), -- i.e. to combine ("mingle" usually translates).--

Later the infamous, calling himself a ‘god’ (in the sense of ‘psychic’) Empedokles of Akragas (Lat. for Akragas is Agrigentum) (-463/-423). This Sicilian postulates that “rhizomata”, literally: prepositions (one regularly translates by “roots”) - later translated as “elements” - control (= determine) the realities in and around us. In particular: earth, water, air,-- fire. Always to be understood as ‘primal substances’.

Note.-- That this is indeed a harmology, a theory of order, can also be concluded from a text attributed to the Paleopythagorean Archutas of Taras (Lat.: Archytas of Tarentum) (-400/-465). “If someone was able to reduce all ‘genea’, (op.: collections/systems) to one and the same ‘archa’, primipium (Lat.), premise (in Greek ‘analusa’, backward premise) and, starting from that one premise, to put them together again ‘suntheinai kai arthmesasthai’ (literally: to put together and combine), then - so it seems to me - such a person is the top figure concerning ‘sophia’, wisdom (Cfr. ETM--METH 340),--equal to the one who possesses all truth as a share (destiny),--equal also to the one who takes a stand from which he can know God and, at once, all realities as God has put them together, especially: according to the model of the pair of opposites and order (Greek: ‘en tai sustoichiai kai taxai’).”

Conclusion.-- Not the ‘quantification’ of so-called ‘qualitative realities’, but the combination, in various forms (modalities), of all kinds of data, including propositions, e.g., or material particles, is the characteristic feature of what one sometimes dares to call ‘Greek mechanics’.

So much for the “precedents” of current combinatorics.

Mathesis universalis.

Some claim that e.g. Galenos of Pergemon (second century AD), the famous physician, wanted to establish a mathesis universalis of all knowledge. Ramon Lull (= Lullus) (1235/1315), the founder of an ecumenism of religions, wanted to create an Ars magna, a combinatorics of sciences.

With G. W. Leibniz (1646/1716; Cartesian), this becomes *De arte combinatoria*, a work somewhat ahead of current logistics.

Cfr. ETM--HARM 189 (already Descartes). Later also the Romantics (ETM--HARM 158).

The logical "pedestal.

Further premise is strict logic.

Let us return for a moment to ETM--HARM 189 (The Cartesian Method).-- Descartes, in the spirit of his 'mathesis universalist' (generalized mathematics), faced with a given and with the demanded, which is the same in all situational-mathematical cases (= problem-solving mathematics), applies a twofold method.

(1) The stechiotic method.

Stoicheiosis -- so we saw -- is to make the whole (all/whole) comprehensible, yes, transparent,-- by breaking it down, for the time being, into its smallest, 'irreducible' (= not reduced to smaller parts/elements) 'elements' ("ta stoicheia").-- This, in order to make that same whole, thereafter, "step by step" again 'whole'.

(2) The summative-hypothetical.

First, the summative induction. For which ETM--LOG 236, then the hypothetical method. For which ETM--LOG 298 (Basic form: if, then).

Which Descartes calls "step-by-step" method. Which, in the other hand, is a form of algorithm (ETM--LOG 262).-- For, on the way to the 'solution' of the problem (= all mathematical operations, which invariably begin with the system 'given/asked'), one totalizes again and again: one always takes into account both the given which is general proposition (for deduction) and the last operation, whose result is less general proposition (for deduction). Until the last localisation (= summative induction) is possible and the problem (= total operation) is 'solved'.

Conclusion.-- Logic governs computational thinking.

Definition of "formalism" (computational thinking).

We set this out in steps. Because actually, these steps form a whole.

1.-- Graphism.

Literally "swearing by what is written. - The singularest element of any formalized process is the singular sign.--which refers us to semiotics (sign theory).

The graphic reduction.

Please reread ETM--METH 350 (reduction understood as partial shutdown).

Appl. mod.-- Take as a sign, agraphic, for the general concept of 'sign'. Well, in formalism, the 't' is reduced to its mere syntactic. It is thus a sense-reduced 't'. Which 'sense' has been omitted (for the time being)? The semantic (= the fact that 't' represents any sign) and the pragmatic (= the intentions, the intended result).

The graphic form is the form present on paper or in the mind (in mental arithmetic e.g., the mind is somewhere the sheet on which the merely syntactic signs 'appear').-- Briefly: the way the ink blackens the paper! The own 'intentionality' (ETM--METH

344), i.e. sharply focused attention, of the one who practices formalism is limited, in the perception of the merely syntactic sign, to the merely legible.

Appl. Mod.-- A specialist in formalized thinking and a child of twelve years of age, e.g., see precisely the same thing, -- insofar as they both represent mere graphic intentionality.-- Cf. ETM--METH 348 (Lorenz and the child, - both 'see' (= strictly phenomenal perception) the same thing.

But with a different total consciousness, of course. Here: the child does not see this sign as matter to which formalizing operations are applicable. In that very limited sense, both specialized and child do not perceive the same thing, since the child only exhibits the graphic intentionality and not the formalistic one.

Concreter appl. mod.

Reread, e.g., the signs introduced by Peano (pasigraphy; ETM--LOG 258), but only the set theory and the number mathematical symbols (the implication - or encompassing - sign, after all, is already logical). Note, in another way, the term "pasigraphy.

Other model.-- ETM--HARM 84: the graphic rewriting of sentences. The signs introduced there "p, q1, q2, r1, r2, if merely formalizing, moreover, merely graphical, are only ways of blackening paper" They are both semantically and pragmatically useless. Merely 'shells' for possible meanings that can be placed in them.

Note.-- ***Bibl. s:*** James Ritter, *Les sources du nombre* (*Entre le Nil et l' Euphrate*), (The sources of the number (Between the Nile and the Euphrates),), in: Le Courrier de l'Unesco 1989: Nov., 12/17.

As an aside: Ritter is the author of, among others, *Eléments d' histoire des sciences*, (Elements of the history of science), Paris, Bordas, 1989.

Ritter writes: "Mathematics is closely related to graphic skill (...). Have not recent ancient discoveries shown that a great many writing systems arose out of the necessity of life to measure, to distribute, to hand out wealth?"

He believes he can identify two graphic systems: a. +/- -3,500 in Lower Mesopotamia; in Soesa (present-day Iran), somewhat later; b. +/- -3,250 in Egypt.

2.-- The actual formalization.

Graphism is the matter, the material object (ETM--METH 325), for formalizing in the actual sense.--Remember J.Ritter.-- *Egyptian papyruses* -/+ -1,500 give models of issues.

For example: Given: a pyramid, the side of which is 140 ellen and the slope 5 hands 1 finger; Asked: to calculate the height.-- "The operation proceeds step by step until the final solution.-- Each part is derivable (1) from the preceding or (2) from some part of the given at the beginning of the text."

One sees it: logification of the graphic signs. The question arises: how do the merely graphic signs acquire a formalizing meaning:

A.-- Syntax in the strict sense of signs introduces first of all meaningful, i.e. logically acceptable, signs. The irreducible (smallest) signs - stechiotic method - can thus be included in composite, well-formed expressions.

B. -- Syntax in the strict sense applies, in the characters so placed in configurations, logic.

Result.-- The syntactic rules -- that's what they're called -- encompass those two aspects (well-formed expressions and logic applications).

This creates a "calculus," i.e., an account.

Appl. mod.

Resume ETM--LOG 258 (Peano): the sign is the strictly logical implication sign. The order "if/then".

Restate ETM--HARM 85 (logical syntax): the characters standing for sentences are "placed" (configuration) and, at the same time, logically connected by encompassing characters, representing reasoning. -- Or take another example. (a --> <-- b) --> (a--b) ^ (b-->a). In colloquial language: if (a--> <-- b), then (a--> b) and (b --> a). The relation "if/then" is also present inside the brackets, as can be seen. Thus one formally expresses the equivalence relation, a harmological phenomenon (ETM--HARM 78).

Conclusion.-- Thus, merely graphic signs acquire a fully formalized "meaning" (but then the term "meaning" is not meant semantically or pragmatically, but purely syntactically).-- So much for the definition of formalism.

Those who know Phenomenology well recognize that here is an application of intentionality theory, namely, the formalizer(s) strictly adheres to his/her formalizing 'intentionality'.

Examples of formalism.
To make the foregoing more colorful, some small-scale models.

A.-- The main account as formalism
Take an example . -
To calculate 27 x 35 "by heart" we apply the disaggregation method.

(1) 27.-- We divide into two subtotals (wholes) 20 and 7. - Thus in the mind we calculate, e.g., 10 x 35 + 10 x 35 = 350 + 350. Or: 20 x 35 = 350 + 350. If two subtotals, then, by summative induction, one total: 350 + 350 = 700.
x 35 can be split into 7 x 30 = 210 and 7 x 5 = 35. Again if two subtotals, then one total, via summative induction: 210 + 35 = 245.

(2) 27 x 35 = 700 + 245 = 945 (again: if subtotals, then via summative induction, total).

Conclusion.-- Summative induction + hypothetical method. With division of totals into subtotals. To make transparent.

Note.-- To make transparent is to fall back on direct intuition, which is at the center of the Phenomenological method. So that formalism consists in calculating with some direct intuitions. Otherwise one does not "see" that the calculation is 'correct', i.e. logically valid.

Note -- Bibl. s.: J.-C. M., *L' ordinateur humain Wim Klein assassiné à Amsterdam*, (The human computer Wim Klein murdered in Amsterdam,), in: Tribune de Genève 04.08.1986.

Wim Klein was a math genius. Nickname: "the human ordinator". -- Klein was a peaceful Dutchman from Amsterdam. Initially, he led an "eventful life." He lived as a "clochard. More to the point: at one time he was persecuted by the Nazis.

But in 1958 he ended up at Cern (ETM--METH 331: Geneva). Reason: calculating purely by heart, he could perform arithmetic operations that the ordinators of the time could not handle. At the Cern he stayed until 1968.

In that year he went back to Amsterdam on rest. This did not prevent him from giving demonstrations at higher institutes in many countries (including Japan). His lessons were instructive and full of humor. -- For example -- In the great auditorium of the Cern he succeeded, one day, in calculating in his mind the nineteenth root of a number of one hundred and thirty-three digits in eight minutes -- With such achievements he entered the Guinness Book several times.

Final conclusion: his housekeeper found him lifeless in his home,--terminated with knife stabs.

As an aside, the evolution of the ordinands brought with it that, beginning in 1974, the ordinands surpassed him.

Note.-- The question arises: does Klein differ from us, ordinary calculators, by more than by a either more practiced or more encompassing intuitive capacity?

Note.-- Bibl. s: Y. Christen, *Etonnantes découvertes d' un chercheur japonais: les animaux peuvent-ils compter*?, (Amazing discoveries of a Japanese researcher: can animals count), in: Figaro Magazine 01.06. 1985.-- Following an announcement in the British scientific journal Nature.

A. Given. Tetsuro Matsuzawa, Institute for Primate Research (Univ. of Kyoto, Inuyama (Japan)), recently showed that a five-year-old female chimpanzee -- name: Ai -- could handle number operations to a limited extent.-- Ai had not only been taught to indicate objects and colors: Ai had also been taught to count objects and colors. For example, she indicates, by means of symbolic signals, three red pencils.

B. Requested. So much for the facts. Now for the requested interpretation.
(1) Everyone agrees that apes - including those other than Ai - use 'words' (= language, 'reason'), yes, to some extent 'argue' with humans (= dialogue, discussion).
(2) Yet whether such monkeys actually speak and discuss as humans do is highly questionable.

The reasoning of Brendan McGonigle (psychologist, Edinburgh).
McGonigle applies the comparative method.

Sentence 1.-- If one shows to children well-organized objects, they recognize them at once. In so-called 'global' fashion. a. Up to and including the number four, only 200 milliseconds more is needed for each attached object. b. Beyond the number four, children need 1000 milliseconds more. This is five times more.

Sentence 2.-- Well, Ai starts to err badly just between numbers 5 and 6.-- Which, compared to children, seems to indicate something analogous.-- postphrase.-- So Ai does not 'calculate' in the strict sense of that word, but immediately grasps the meaning through "direct intuition" (immediate perception). Just like children.

B.-- The account of writing as formalism.
We are going to briefly examine these operative treatments that take place in the interiority of the mind in more than one form.

B.1.-- The numerical account.
Here we must pay more attention to the configuration.-- Take the same multiplication "27 x 35".

Every schoolchild learns over time that the ‘units’ - 5 and 7 - and the tens - 2 and 3 - are (1) placed and (2) are ‘correctly’, i.e. according to syntactic rules, governed by logic. The split elements are placed in a logically strict order from right to left: first the units ‘E’, then towards the left the tens ‘T’, etc.

Appl. mod.-- _ 27
x35
135 81
945
HTE

The split is clear: first 5 x. 77, then 3 x 27.
The totalization of subtotals, result of summative induction = is also clear: 135 + 81(0) = 945. - Each step takes into account all that precedes: **a.** the given (27 x 35 = x), **b**. each subtotal, along the way. Which is an “if/then” reasoning (hypothetical method). In particular: if all that goes before, then all that follows (from it).

Shortened: (logical) prefix/ (logical) sequel.-- That’s logical syntax. Calculus. ‘Formalism’. Like a machine, the elementary school child learns, without any explicit philosophical-logical training, to apply the configuration. - Which amounts to a logical-syntactic ‘algorithm’.

B.2.-- The letter calculus.

We have already seen that, under one point of view, namely, the summering (collection): ETM--LOG 247v. (Algebraic application).-- Also the aspect of “lemmatic-analytic method”, present in the employment of letters for numbers (by means of vaguely acquaintances editing possible acquaintances).

Algebraic model.

Given: the ‘equation’ (= ontological : analogy) “$ax^2 + bx + c = 0$.

Asked to “solve” the equation. -- For example, “$(ax^2 + bx + c) - c = 0 - c$”. Which leads to “$ax^2 + bx = -c$”.

Here we face a syntactic rule (ETM--METH 350), namely, “For all bridges, any member of an equation may be transferred to the other side, if it is given an opposite sign (+, - become -, +).

This mechanically, without any explicit logical analysis perform syntactic rule that relies, of course, on a justification ... of a strictly logical nature. Here e.g.: the equal sign forces absolute equality on both sides, precisely because of the exchange of sign values.

Note.-- Consider how an algebraic equation is a rigorously logical configuration, within which, sometimes with some slack, each component is placed and subjected to logical syntax.

B.3.-- The logistics (logical account).

Bibl. s.: G. Jacoby, *Die Ansprüche der Logistiker auf die Logik und ihre Geschichtschreibung*, (Logisticians' claims on logic and its historiography), Stuttgart, 1962, 9 (Bremer Philosophenkongresz 1950).

At the Congress of Philosophers in Bremen (1950), one of the topics of discussion was the distinction between traditional, ontological logic and current "calculating logic" or logics.

Bruno von Freytag, known for his *Logik* (*Ihr System und ihr Verhältnis zur Logistik*), (Logic (your system and its relationship to logistics),), Stuttgart, 1955-1, 1961-3, explained to the logicians from many countries gathered there that there are many logical calculi, but only one logic,--- the latter being concerned with concepts and judgments, insofar as they are involved in reasoning. In Platonic language: the three "elements" of philosophical logic.

Similarity and difference (analogy).-

Take a single applicative model.

A. Logic.-- Reread ETM--LOG 312 (Immediate Derivations). Do "syntactic rules" exist in logistics than "rules of thought" exist in logic. E.g., the logical conversion rule: "In a closing speech, a negative judgment of general scope (general negative judgment) may be 'converted'. Thus: a. "No man is a stone". b. Converse form: "No stone is a man".

Practical: subject and predicate may be interchanged. - Symbol shortening.-- S (= subject, subject), P (= predicate, predicate), e (= is not) (= nEgo, in Middle Scholastic-logical Latin: I deny).-- So the rule of thought reads, "For all sentences of type 'S e P' they are interchangeable to 'P e S'.

Conclusion.-- Traditional logic also has its symbol abbreviations, standing for syntax. But it remains initial.

B. Logistic.

In formalized logic it reads as follows: "There is a syntactic rule, applicable to S e P (universal negative judgment) such that the letters (note: letter-account) before and after e - in all formulas of the type "X e Y" (note: regulatory model) - may be inverted (= be convertible);

Conclusion.

The letter arithmetic introduced by Francois Viète is the transition to the logistification of logic. But the intuition remains the same. Syntax, thanks to letter arithmetic, is implemented.

B.4.-- The computational account.

Bibl. t.: Ph. Davis/ R. Hersh, *L'univers mathématigue*, (The mathematical universe), Paris, Gauthier-Villars, 1985, 131.

Proposers touch on one of the basic propositions of computational thinking.

I.-- The running ('readable') mathematical text.

a. The premise of the present mathematical text is that it is at least formalizable, thanks to e.g. one art language.

b. In fact, ordinary textbooks of mathematics contain at most sections that are formalized. "They are written in French, English, or other languages of manners (ETM 26v. (Neo-Retoric)), for they serve to be read by human beings." -- The language of art par excellence is the theory of collections,-- according to the authors. Cfr ETM--LOG 251 (G. Cantor). In other words: the summative tradition!

II.-- The ordinator.

Cfr. ETM--LOG 262vv. (Algorithmic Thinking).-- Stellers say that one application of formalized text is the program of an ordinator (ETM--LOG 263v.). To program an ordinator--applicable e.g., to test arithmetic in an enterprise--one must:

a. The graphism (ETM--METH 356), i.e., the vocabulary (vocabulary) and

b. Know the syntactic rules, i.e., the "grammar" (a metaphor) that governs that vocabulary, the basic terms. (ETM--METH 358).

Conclusion.-- In the language of manners, the whole situation is thought along, without being spoken out. In the ordinator there is no such situation: also, everything must be explicitly formulated. Nothing may be under understood, as in the language of manners.-- That is the totally mechanical of it.

An application

Bibl. s.: A. Crettenand, *Colloque scientifique*: *Eh bien, jouez maintenant*, (Scientific symposium: Well, play now), in: Journal de Genève 31.07.1987.

After the fashion of the audiovisual and that of the microcomputer the "fashion" of the simulation game, especially in the USA. (Cfr. ETM--METH 348.) Economists, structural engineers, military personnel practice it busily.

1. Base: a small program suitable to 'calculate', logically strict, probabilities. So e.g. that of a politician to get elected.

2. Further necessary condition: preferably all factors ('elements') affecting an election, such as the city or town, the parties, the women, the religions, etc.

The interested party has only to 'play': the program is such that the logical results (if factors, then probabilities) give off the probabilities ('output'). Subject matter of this: audiovideomatics.-- Again: summering (summative inductions) and ... hypothetical method (if, then), but now applied to the ratio "factors/ probabilities".

Study notes.

The focal point is logic (theory of thought), which on the one hand, has as its premises:

a. a minimal ontology (theory of being, metaphysics) and

b. a harmology (theory of order, theory of relations) and on the other hand as an elaboration (application) the methodology (applied logic).

Now follows a bookmark, with study notes.

foreword (01-07)

Sample 1: ontology (08-11) Knowing thoroughly

Sample 2: the ontological method (12-15) Main issues

sample 3: phenomenal, rational, transempirical / transrational (16-19) main issues (cfr. 336vv.)

Sample 4: tropology (tropology): metaphor, metonymy, - synecdoche (20-27) Knowing thoroughly. Cfr. 25 (identitive) 90/92, 102, 186, 291.1.

Sample 5: ontological concepts are transcendental concepts (28-35) 28/31: know thoroughly - Concept, term, scope content). Categorical (singular, private, universal) transcendental (= all-encompassing). Existence (existence) / essence (mode of existence) cfr. 129 (creature form)

Sample 6: digression: categories (platitudes) (36-42)

Sample 7: the alethic ('physical') modalities (43-49). Remember well: necessary / non-necessary (possible, probable, etc.) necessary not and obligatory (must) / non-obligatory (may) / obligatory not (may not)

sample 8: being and nothingness (50-57). Remember: "the absolute (= absolute) something" and "the relative (relative) nothing".

Sample 9: being(de) as inviolable 'sacred' (58-64)

Sample 10: ontological judgments are transcendental judgments (65-71) Esp. 65/68 (knowing thoroughly). Judgment/proposition (sense, statement). Identical nature. Clarity nature. Model-theoretic nature (subject = original, proverb (= model). Comparative nature. Quantity (categorical (sing./ partic./ universal) and transcendental) quality (affirmative, negative and restrictive (reserved)

Knowing Logic 291/297 (theory of judgments) thoroughly. Metaphorical and metonymical judgments. Meaningful / sense-making judgments. Analytic / synthetic judgments (cf. I. Kant - who uses the terms in a different sense than Platon.) cf. 292/293: 293vv..

Note: It will be noted that similarity (metaphor, distributive structure, collection) and coherence (metonymy, collective structure, system (system) or its negation (contradiction) recur again and again, - as identitive fundamental concepts.

Sample 1l: (judgmental/orderly doctrine (72-76) Main Issues

Sample 12: Relation Theory (77-79) Thoroughly know. Reflexive (looping) and nonreflexive (e.g., reciprocal (symmetric), transitive (transitive), clarity relations).

Sample 13: relations logistically speaking (80-89) Main issues (include (imply) or own (inherent to)

Sample 14: structure, collection, system (90-96) Thoroughly know. Structure (network of relations), - distributive (metaphorical, collecting) and collective (metonymical, systems theory) structures. - Systems theory (essentials). Cfr. 106 (all / whole)

Sample 15:: sign(symbol) and model (98-105) Main issues: the three semiotic aspects (syntact. / semant. / pragmatic) cfr. 84/85, 105. Remember: map (metaf., similarity) / signpost (meton., coherence)

Sample 16: similarity and coherence in psyché (106-111).
sample 17: contradiction theory (112-124)
Sample 18: dichotomous theory (complementation) (125-139)
sample 19*:* measuring equation (140-143)
sample 20: differential learning (144-153)
Sample 21: quantitative changing/ qualitative leap (154-163)
Sample 22: chaology (disorder doctrine) (164-175)
sample 23: crisis doctrine (176-184)
Sample 24: comparative (comparative) method (185-194)

Sample 25: harmology: assimilism (concordism)/ identivism/ different(ial)isme discordism) (195-201) note. Similarity and coherence, -- but also non-similarity and non-coherence (which, paradoxically, also establish similarity and coherence) dominate the entire harmology.

sample 26: introduction (202-210)
Headings, esp. 207/210 (definition, the logically valid relation, i.e., entailment (implication) expressed in a hypothetical (conditional) sense. Thoroughly know. Symbol shortening: if FS., then AS. Deductive: if A, then B, and if A, then B. Inductive (reductive): if A, then B, and if B, then A

Sample 27: concept theory (definition) (211-221)
see 5 supra. Concepts appear in logic, insofar as they are components of judgments

Sample 28: theory of concepts (Platonism) (222-2271)
see 5 supra: behold. ond.

Sample 29: theory of concepts (classification, grading) (228-235)
Knowing only 229 (lucky enumeration) thoroughly.

Sample 30: comprehension theory (induction) (236-241)
know thoroughly. 'Induction' is sampling method. In all (collection), in whole (system) summative (knowledge or information summarizing) and amplificative (knowledge expanding) induction. Range square. Socratic, baconian induction, i.e. general and causal induction.

sample 31: comprehension theory (collecting) (242-253)
Remember 244v. (stechiotic method) 247. (lemmatic-analytic method).

Sample 32: comprehension theory (algorithm) (254-261)|.
Remember the praxeological definition (initial situation, algorithm, final situation) (254)

cfr. 95 (targeted system)

Sample 33: comprehension theory (algorithmic thinking) (262-270)
computer algorithm, automatic washing machine as a model (263)

Sample 34: concept theory (individuology) (271-273)
ideography as a description, resp. explanation of the individual (singular, unitive)The proper name

Sample 35: concept theory(individuology) (274-285)
Definition of singular (syn) and diachronic, coimbram method, singular situational method. Median method (convergence), detectives method.

Sample 36: concept theory(individuology) (286-290)
scientific definitions

sample 37: doctrine of judgment (propositional doctrine) (291-297)
see 10 supra

Sample 38: reasoning theory (the hypothetical sense) (298-302)
Before and after (FS, AS). Typology of nazines (302) de- and abduction by Peirce.

Sample 39: reasoning theory (evidence/ argumentation/ argumentation) (303-307)
logical and non-logical reasoning

Sample 40: reasoning theory (syllogistics - closure theory) (308-312)
Categorical and hypothetical syllogism

Sample 41: reasoning theory: syllogistics: typology) (312-321)
esp. 318/321 (platonic closing argument). Knowing the latter thoroughly.

Sample 42: method theory(applied logic) (322-328)
mainly 323: epistemological definition (search work + argument)

Sample 43: method theory (theory) (329-335)
mainly definition (329). System of (a) opinions, (b) of propositions (judgments, such that what is given becomes intelligible,; Also called: the merely verifiable part of science. Hard / soft science. (330/331)

Sample 44: Methodology: direct and covered method (336-343)
perceptual acuity (finesse) / reasoning mind (esprit géométrique). The concept of metatheory (330/340), i.e., the theory concerning the theory.

Sample 45: method theory (the phenomenological method (334-353)

This is the basis of any direct method. Intentionality. Consciousness psychology (phenomenological psychology). Phenomenology as description, as business message (with the reductions, i.e. eliminations such that the object is exposed.

Sample 46: method theory: the arithmetic or formalism method (354-363)

semiotics (the purely syntactic), combinatorics (placement) and especially logic (step-by-step method (algorithm) as presuppositions.

Definition of ‘formalism’: 1. Graphism (the blackening of paper) 2. Logicism (editing meaningful characters according to syntactic rules).

Examples: a. head arithmetic, b.1. number arithmetic, b.2. letter arithmetic, b.3. logistic (logical arithmetic), b.4. computational arithmetic (ordinator arithmetic). This is clearly an indirect method: not ‘description’ as in phenomenology, but arithmetic is the task.

For the exam: either the phenomenological method or the formalism method, as far as the main issues are concerned.