

Elements of natural logic
Learning to think logically.

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1. Introduction

These "Elements of Logic" attempt to show that correct natural thinking exists and has its own being. This is merely the elaboration of the common sense, i.e. the ability - in principle inherent in all human beings - to perceive and reason correctly. However, one does not confuse this - as so often happens - with simplistic reasoning. What follows will make it clear that this is not the case.

Commonplaces.

These are basic concepts and judgments that are present every time we think.

Forma. The first commonplace is the concept of forma. This Latin word means "given" and refers to the actuality, to the essence or identity of "something," of "a being. The reality of 'something' is perceived, known by mind and reason, and recorded in a concept, a thought-content, or a 'forma'. The multitude of data that make up reality are indeed knowable and are stored in various thought contents, in formae. This explains the name "formal logic," logic of the forma. Thus, after beholding a number of concrete triangles, the mind grasps the abstract concept of "triangle. This geometrical form is one kind of forma.

Similarly, in mathematics or logistics, one also knows the concept of "formula," as a diminutive of "forma. This is a rather limited number of symbols that contain the identity or creature structure of something and represent it in a clear manner. Think, for example, of Einstein's formula $E = mc^2$. Such "formulae" are not directly the object of this exposition, except as symbol shortening of a forma or knowledge content. However, they illustrate the way in which a thought content, a structure of being, a 'forma' can be grasped.

Formal or natural logic. This deals with logical laws: How to derive from sentences via logical reasoning other sentences? It is limited to purely hypothetical sentences and reasoning. It has absolutely no claim to be applied logic (methodology), or theory of knowledge, or to make statements belonging to any other science. Formal logic, therefore, does not pronounce whether sentences are in fact true or false, but rather whether they are correctly derived from previous sentences given. The conceptual content is decisive, not the actual truth or falsity. Natural logic is not an epistemology or theory of knowledge; it only pays attention to the justifiable connection between the prepositional phrase(s) and the postpositional phrase in an argument.

Thus: "If all whales are fish, and this specimen is a whale, then it is a fish." For formal logic, this is valid reasoning. Indeed, from the given prepositional phrase, a valid derivation is made. However, as applied logic, as science, it is wrong because its preposition is false: whales, contrary to what their name would suggest, are not fish but mammals.

As will be explained in detail later in this paper, the forma takes three main forms, namely, understanding, judgment and reasoning. A classification that has become classical in Aristotle's track reflects this.

Problem, solution. Basic order in exposition is "task (given/requested), solution." Only a given in itself does not lead to a movement of thought; that requires a task, a demand. Given and asked belong together in that they are both necessary and must be understood in order to grasp the actual task. The solution is the answer to this. This includes combinatorial notions of 'configuration' (set of places) and 'algorithm' (sequence of places).

Ontology. Natural logic is ontological, that is, situated in the whole of reality. Indeed, ontology means doctrine of reality, the doctrine of "being," of what really "is. Ontology asks, "What is reality without more?" She speaks, therefore, of the totality of all that is, of everything that even exists. Her field includes everything, and everything of everything. Not only all that is sensually given, but also all that is dreamed, all fictions, all that can be thought is ontologically "something" and therefore "a reality. Ontology seeks the identity of things "in itself," objectively, independently of a subjectively thinking human being.

Identity. Logic relies on the identity of the forma, and this threefold: total identity (of something with itself) / partial identity (analogy) of something with something else (resemblance and coherence) / total non-identity of something with something else (contradiction). This is the artery. "All that is (so) is (so)" interprets total identity. "This flower resembles that flower" refers to partial identity. "This flower has grown out of the earth" likewise refers to partial identity. "2+2 does not equal 5" conveys non-identity. In this context,

the pair "original (which asks for information) / model (which provides information)" as well as the concepts of sign, trope (metaphor / metonymy and synecdoche) come up.

Deduction and reduction. These are the two basic forms of reasoning. Induction, especially summative (complete) and amplificative (incomplete) induction, which involves reasoning on the basis of samples, are situated in that framework.

Laws of thought and the errors of thought. A final commonplace are the laws of thought and the errors of thought. Behold the main one.

Whoever has mastered that - and that is quite doable after reading and thinking through all that follows - , comes home to correct natural thinking.

2. The title: 'Elements' of natural logic

Let us dwell for a moment on the title. - 'Stoicheion' (Lat.: elementum), plural 'stoicheia', in ancient Greek meant 'constituent', i.e. either specimen of a set or part of a whole (system). All the elements of a collection belong together by virtue of a common property, of similarity. That property is distributed among all instances, distributively. All parts of a whole belong together, now not by virtue of similarity, but rather by virtue of coherence, collectively. So that as a title "elements of natural logic" means "the result of looking up the constituents of what logic is" (which presupposes summative induction or sampling).

Premise. "Archè" (Lat.: principium) in ancient Greek meant "what governs. Thus a government that controls the people. In the intellectual field, the 'presuppositions' (also called principles' or 'principles') that govern an exposition. 'Axiom' in ancient Greek meant "what is so valuable that one puts it first" either in life or in an exposition. One still encounters this meaning in the term 'axiology,' i.e., doctrine of value.

Remark. One can come across ancient Greek titles that read "Stoicheia kai archai" (Elements and presuppositions), such that both terms went together, yes, ran into each other and one could stand for both (which is a synecdoche or co-signification: a part stands for the whole, see below). One thinks of *Elements of geometry* from the hand of Euclid (-323/-283) in which point, line, plane and body are such elements: unproven, indeed unprovable basic propositions from which further geometrical theorems are constructed deductively. Or still to St. Paul's *Elements of the World* (so in the Bible: Galatians Letter 4:3 where Paul talks about the factors that must be presupposed as constituents if the world is to be understood as it actually is with its many deficiencies). 'Element' here means "all that controls the world." Also in our title, 'elements' means "elements and presuppositions."

Introductory Teaching. 'Propaidea' or also 'propaideuma' meant in ancient Greek

"introductory instruction." This course is "propaedeutic. (a) Using samples from the whole of logic, (b) this course offers two things: information and method. It is not encyclopedic - complete.

a. Information. 'Informatio' in Latin means "introduction of forma" or essence. The 'forma' of something is that something insofar as it has its own content of knowledge and thought. Hence, this book is 'formal', paying attention to the forma, logic.

General formative. The information offered here is not dilettantical ("A dilettante knows something about everything"), nor is it specialist ("A specialist knows everything about something"), but general formative as the ancient Greek term 'philosophia' (in one of its meanings), meant, i.e., "general formation." 'Sofia' (Lat.: sapientia) meant 'wisdom' in the sense of "broad view of world and life o.g. experiential knowledge and thoughtfulness."

b. Method. 'Method' is "the way to," approach. 'Fashion' is the superficial way to information: one thinks along with the big stream but not in depth. 'Ideology' is another method, namely, one lives by a set of axioms in which a number of interests express themselves in such a way that objective truth (what is real information) becomes second-rate.

Method in the logical sense is "to set forth on one and the same subject or fact a set of conceptions (notions, judgments, reasonings) in such a way that it is the best way to realize the path to that subject." Thus *La Logique ou l'Art de penser* by Antoine II Arnauld (1612/1694) and Pierre Nicole (1625/1695), - also called "*La Logique de Port Royal*," after the famous French abbey at Port Royal that housed writers and philosophers, among others.

We will see that the best way to translate "method" is "applied logic. Logic in three senses. We already had "formal logic." Now we learn about "applied logic" (method theory, methodology). There is also "fundamental logic," that is, exposition of the "foundations" of logic. 'Fundamentals research'. In fact, the three are distinct but not separate with the result that occasionally foundations are touched upon in formal logic and applications are brought up in it. Descriptive logic only reflects how in fact reasoning is done (see further: reasoning theories, cf. 4.8.2).

3. Logic

Denomination. Following in the footsteps of Socrates of Athens (-469/-399), Plato of Athens (-427/-347), for many the greatest philosopher of the West, called his theory of

reasoning "dialectics" (in which the socratic dialogue method is still clearly resonant). As is well known, Socrates liked to define concepts very precisely. He took stock of the existing and sometimes confusing opinions of others in order to arrive at a purified concept and a correct definition of the question through thoughtful questions, through word and word, through dialogue.

Aristotelians, relying on the two-volume logical main work of Aristotle of Stagira (-484/-322), called their theory of reasoning 'analytic' (the theory of judgment in it was also called 'dianoetic'). The name 'logic' dates from Stoics (perhaps from Zeno of Citium (-336/-264)).

Most general premises. Each exposition is based on 'axioms' (presuppositions), whether or not explicitly stated. This exposition relies on M.Müller / A.Halder, *Herders kleines philosophisches Wörterbuch*, Basel / Freiburg / Wien, 1959, 99/101 (*Logik, Logistik, Logizismus, Logos*) and on W. Brugger, Hrsg., *Philosophisches Wörterbuch*, Freiburg i. Breisgau, 1961-8, 184 / 187 (*Logik, Logistik, Logizismus, Logos*).

Definition. One of the most common definitions is given by M. Apel, *Philosophisches Wörterbuch*, Berlin, 1948-2, 148. Logic is the science of the laws concerning right thinking. It decays into 1. a doctrine of elements that talks about "concepts, judgments, reasonings" and 2. a doctrine of methods that shows how, thanks to those elements, "the whole of a scientific system" is established, paying particular attention to "the scientific methods of investigation and proof. The exposition will elaborate that definition but within the limits of natural logic.

Natural logic. 'Natural' we call that theory of reasoning which corresponds as far as possible to the natural reasoning of - what is called - 'the common mind', i.e. all people gifted with common sense with a common faculty of knowing and thinking.

Reasoning we all perform over and over again in our frequently complicated situations, in which it is not unimportant that we, as thinking beings, become explicitly aware of our daily doings in this regard.

In this regard, one can refer to J.-P. Zarader, coörd., *Le vocabulaire des philosophes*, vol. 1 / 4, Paris, 2002, in which each explained word is described in three stages, viz.

1. basic definition (accessible to a beginning student),
2. scientific approach (intended for a specialist),
3. freer approach and interpretation.

Well, this exposition adheres as much as possible to the first level but with digressions toward the second and third.

Commonplaces. Note: In 1982, Dordrecht/Hingham published a journal entitled "Topoi" (*An International Review of Philosophy*) that highlighted "commons" in a series of specialties. "Koinos topos" (ancient Greek) meant "commonplace," i.e., something that recurs again and again in the course of an exposition as a basic concept and basic judgment. We are now going to set forth the main platitudes of natural logic that are necessary for a smooth reading and understanding of logic proper.

Forma. This logic, as already mentioned, is called "formal logic," i.e., "logic whose object is the forma," i.e., the content of knowledge and thought. The main formae are understanding and judgment. These become "logical" insofar as, given well-defined laws of thought, they contain reasoning. Nevertheless, concepts and judgments are fundamental since they fundamentally govern reasoning.

4. Samples

A sample is either a specimen from a collection (whoever has tasted one mango will henceforth know what a mango is) or a part from a whole (whoever has tasted part of a mango will know what the rest may be). This book grew out of experience. Those who teach logic for years find that a long exposition - masterpiece of sustained thought - repels most contemporaries - especially when they are in the thick of life and already oversaturated with all kinds of information. They do, however, gravitate to short pieces of text, each of which brings up a single (therefore not yet superficial) topic. That is the reason for the sampling structure of this book.

Natural Logic. Such theory of thought as it has evolved over the centuries is both a collection and a system of logical insights; peculiar to the common mind; insights that are not so simple. In this sense, it is a "matrix," a mother ground of axioms, theorems and methods, peculiar to a community of tradition. The way out: one goes through the material by means of "paradigms," paragon that are each time specimens or parts of correct reasoning. Concrete examples are again and again applications of general insights made more comprehensible precisely in and through those examples. Thus, over time, a comprehensive picture of the whole comes clearly to mind.

So this book is not encyclopedic. The title is therefore Elements and not The Elements because with the determinative article that would mean comprehensiveness and completeness. In this sense, the text offers only samples but in such a way that the whole does not appear too incomplete.

Bibliography. The same goes for the bibliography: it is minimal. Enumerating long lists of books on the subject may exhibit "scholarship"; for the audience targeted by this course, such a thing is of little or no interest. It does, however, regularly read, "Bibl. st." (mean: 'bibliographic sample'). Out of the abundance of books, a text is then quoted or paraphrased from a work that concerns the subject of the sample. The quoted text is usually an argument of authority but can sometimes also give rise to comments. However, this does not mean that only the mentioned work on the subject was consulted.

Tradition. We deliberately first examine what was said on the subject in the past, in the conviction that people in earlier times also thought logically and wrote logically that is still valid today. The opposite appears to us as "not suffering from excess of humility. The basic works used in this sense are the following. To begin with O. Willmann, *Abriss der Philosophie (philosophische Propädeutik)*, Wien, 1959-5, part 1 of which is *Logik* (o.c., 3/142). It is still sound.

We quote it with "Abriss. Willmann represents the platonic-idealist tradition. Then there is Ch, Lahr, *Cours de philosophie, I (Psychologie. Logique;* the latter o.c., 491/718), Paris, 1933-27. Quoted as "Cours. Lahr represents the French-Cartesian streak- after René Descartes (1595-1650), Latinized Renatus Cartesius, French philosopher and mathematician- , and is also much more current than Willmann. This does not mean that we do not go beyond these outstanding pioneers. We are building on what they bequeathed just as they-whatever Immanuel Kant (1724/1804), the great German Enlightenment philosopher, also asserted concerning the stagnation of traditional logic-built on pioneers in the centuries-long tradition since Plato and Aristotle. What that tradition claimed is largely like ancient oaks that endured many storms.

Logistics.

Logistics is not logic. Logic relies on (total or partial) identity concerning data ('assignments') and works with conceptual content. Logistics 'works', 'calculates' with signs, symbols, stripped of their meaning, and pays attention to their relations.

Profs at universities, if they consider what the majority of students take up with logistics, understood as a mathematical positive science, may find that it is simply nothing: "Too complicated." Or "Not practical." Once a prof said "I don't teach that anymore. They can't do anything with it anyway". "They" being those who enter life after their studies. We are convinced that they have more use for a piece of natural logic. This does not mean that we have no respect for logistics. On the contrary: even natural logic can learn a lot by getting acquainted with logistics. If only to become more aware of its own nature.

5 Punctuation marks

A punctuation mark is a quasi-unmarkable character that separates the parts of a text "to make reading easier" (according to van Dale's Large Dictionary). A quotation mark is a punctuation mark (consisting of a ' or a ") that serves to separate a quoted text front and back from the text of the person quoting but also to indicate a certain "particular" designation as such. These are the two main uses of quotation marks.

Bibl. st. I.M. Bochenski, *Philosophical methods in modern science*, Utr. / Antw., 1961, 73/74 (*Use of quotation marks*). Steller sets forth a kind of precept observed by most logicians and logisticians and science methodologists, respectively. If an expression denotes either itself or a similar expression, then one puts it in quotation marks. In other words, such expressions, if without quotation marks, denote something other than themselves. An expression so quoted is part of a meta-language (a language about language).

A beautiful flower is a joy. That is the unquoted form of text. A "beautiful flower" consists of two words and ten letters. In quotes, "beautiful flower" does not mean a beautiful flower but the two words "beautiful flower." A beautiful flower consists of two words and ten letters. This is a meaningless statement because it says of an actual beautiful flower what is only sayable of the two words "beautiful flower"!

One will note that in our text the quotation marks: '...' for one word, "... " for more than one word, occur very frequently. Why? Because natural logic is a logic of concepts in which, as will be further explained, concept content and concept scope play the leading role.

When introducing a term, the term is written in quotation marks as regularly as possible to draw attention to its meaning. For logic exhibits a number of its own terms that are often unfamiliar to the reader. The quotation marks "say" "Pay attention: it is a new word and pay attention to its meaning!"

For familiar words, quotation marks are used to draw attention to the fact that the reader may have a still too vague knowledge content of it. This involves prompting the reader to define the term to himself or relying on what he reads, i.e. to recall the conceptual content as clearly as possible. It is a fact that even if we usually think as precisely as possible, we still walk around with some vague concepts.

Sometimes one will encounter something like this: "The meaning - well, the logical meaning - ...". The interruption marks draw attention to some clarification noted "along the way," where "along the way" means "briefly."

Sometimes also will read 'The meaning, - among others, the logical but also the non logical, plays a role ...', The sign '-' aims to sharpen the attention by briefly interrupting the expected sentence formation.

6. In summary.

Either citation or drawing attention. This is the role of those punctuation marks that one does not usually find in texts. They are in no way a matter of linguistic whim or anything of the sort. In other words, punctuation marks are also a "forma," a content of knowledge and thought and therefore information.

This chapter summarized: This "elements of natural logic" aims to show that correct and natural thinking exists. This thinking has as its basic concept the knowledge content, or the "formae," the identity of things. Natural logic seeks to derive from sentences validly other sentences. This involves reasoning from a given and a requested to a solution. Natural logic is ontological, it situates itself in the whole of reality. It looks for identity, partial identity or not-identity of a given with another given. Comparing data with each other thus becomes central. This 'elements of natural logic' seeks to seek the constituents and premises of what logic is, providing information and method to arrive at right thinking. The main formae are: understanding, judgment and reasoning, and these are situated in a doctrine of methodology. Far from striving for completeness, this little work attempts to offer a series of samples and examine what tradition has left us in this regard and how insights grow. In all this, punctuation also contributes a great deal to a correct and accurate grasp of information and insight.