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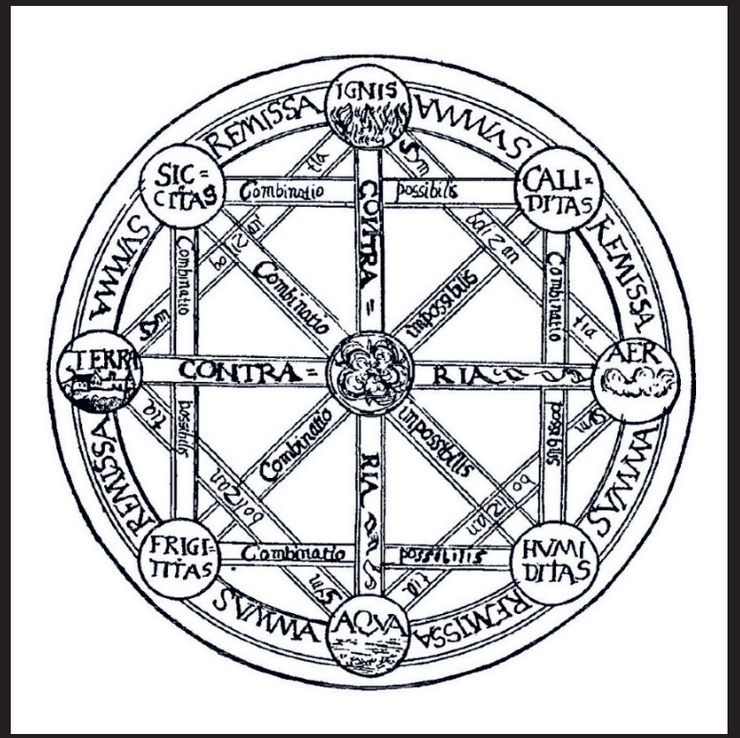

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To Sanja
in gratitude for the fifty years of love

PREFACE

This volume is grounded in ideas developed across several essays – published, unpublished, or prepared for publication – in *The Logical Foresight*, a journal for logic and science issued by *Academia Analitica*.[1]

In Essay 1, *Implicitness of Logos and Explicitness of Logics in Ancient Philosophy*, we examine the semantic and syntactic transformations of the concept of "the logical" in ancient philosophy in the forms of crypto-logos, para-logismos, dia-logos, and syl-logismos. We interpret Heraclitus' concept of *logos* (λόγοσ) as a *crypto-logos* through which intuitive insight (ἐπίστασθαι γνώμην) reveals the hidden or implicit harmony (ἁρμονίη ἀφανήσ) in nature (φύσισ) as the conceptual unity of ontic opposites (τὰ ἐναντία). In Parmenides' paraconsistent concept of the identity of being and thought, we point to the para-logical hypotheses about the One that unfold through antithetical deductions of thought and that preserve the dynamics of the ontic determinations of being (ὄντοσ) within the statics of the conceptual determinations of Being (τὸ εἶναι). As the beginning of the explicative granulation of *the logical*, we consider Plato's concept of the dialectical skill (διαλεκτικὴ τέχνη) – the

[1] Academia Analitica – Society for Development of Logic and Analytica Philosophy in Bosnia and Herzegovina is founded in july 2007. https://academia-analitica.ba/

method of dividing genera into species and sub-species, which logically represent ontic opposites within problem-formulated questions. Finally, Aristotle's concept of λόγοσ as a statement-making sentence or proposition (λόγοσ ἀποφαντικόσ) renders explicit *the being* (τὸ εἶ ναι), or being as being (τὸ ὄν ᾗ ὄν), through the semantic and syntactic figures and modes of syllogistic inference in which the correspondence between the ontological (εἶναι), ontic (ὄντοσ), conceptual (λογικῶσ), and linguistic (λέγομενον) is displayed. We conclude that, with these transformations of the concept of λόγοσ, the path leads from the hidden or implicit Truth of the phenomena of nature and the world (πᾶν) to the explicit truthfulness of propositions as the unhiddenness (ἀλήθεια) of being, achieved through the semantic and syntactic correspondence of the logical structures of being, thought, and language in scientific knowledge grounded in definition (ὁρίσμοσ) and demonstration (ἀπόδειξισ).

Essay 2, *New Remarks on the Concept in Logical Use*, advances a thesis directed against the traditional (cognitive-theoretical) definition of the concept, which claims that a concept is "the thought about the essence of the object being thought" that is, "a set of essential features or essential characteristics of an object". Yet the "set of essential features or essential characteristics of an object of thought" is the content of the thought. The thought about the essence of an object is a definition, and the concept is not the definition itself but

only a part of the definition. Moreover, as a component of the formal structure of thought, the concept possesses calculative logical properties that, in formal logic – whether in syllogistics, propositional logic, or predicate logic – occupy a central place in formal logical computation. Without the *calculative properties of concepts*, there would be no calculative properties of the propositions that express thought (thought-structures). The calculative properties of a concept include: (1) the degree of its logical generality (degree of variability), (2) the logical relations it can establish within the totality of conceptual content, (3) its operability within structures of affirmation and negation, and (4) its deducibility within either axiomatic or probabilistic systems. Therefore, we maintain that, from a logical point of view, the definition of a concept should be applied in favor of its calculative properties that it possesses.

In Essay 3*, Some Characteristics of Referential and Inferential Predication in Classical Logic*, we examine the relationship between traditional formulations of basic logical concepts and confront them with new and contemporary approaches to those same concepts. Logic is characterized in different ways depending on whether it is associated with syllogistics (a referential – semantical model of logic) or with symbolic logic (an inferential – syntactical model of logic). This distinction is not merely a difference in the logical calculation of (1) concepts, (2) statements, and (3) predicates; it also appears

in the treatment of the *calculative capacities of logical forms,* the ontological-referential status of conceptual content, and the inferential-categorical status of logical forms. The fundamental markers – or basic ideas – that distinguish ontologically oriented logic from categorically oriented logic are: (1) the concept of truth, (2) the concept of meaning, (3) the concept of identity, and (4) the concept of predication. In this essay, these differences are explicitly demonstrated through the introduction of differential terminology. From this differential methodology, a new set of characterizations of logic emerges.

Essay 4, *Logical Identity: A Holistic Approach*, presents several consequences of Quine's thesis on the dependence of ontology on ideology (Quine, 1980), seeking support for my own thesis concerning the dependence of the (theoretical) existence of entities on the type of identity – that is, the dependence of ontology on logic and language. If Quine's thesis is correct, then we may extend its implications and claim that ontology depends on identity, or more precisely, on the identification of the "identity criteria for conceptual schemes" (Davidson, 2001) constructed within a theory. Consequently, we will speak about types of identity that shape the choice of ontology and upon which the ontology of a theory depends. Here, we aim to connect the different uses of the term identity in Aristotle's writings – and the various types of predication grounded in them – with the concept of identity as the equivalence of symbols in

modern logic. We propose to reinterpret Quine's statement, "There is no entity without identity", in the form of an implication: "What (kind of) identity, such (kind of) entity. Like identity, like entity. "

In this printed edition of *Essays on the Logical*, several typographical errors have been corrected, some terminological aspects have been improved, and in some cases more appropriate choices for the graphic presentation of sections have been adopted compared to the electronic edition from 2022. The introduction has been expanded and refined in several places to express the ideas presented in the essays more accurately. All corrections are of a formal nature.

Nijaz Ibrulj

June 27, 2026

INTRODUCTION

From Aristotle's syllogistic, through symbolic and mathematical logic, to logical programming and artificial intelligence – logic is always *computation with words* and *calculation* with symbolic notation. For this reason, logic – much like mathematics – concerns itself with the *calculable forms of human thought*, whose "solutions" take the form of correct inferences and valid proofs.

Logic does not operate within the Nature, but within the *Universe of Discourse* (the world – language – thought triangulation) in which logical and linguistic variables can be transformed into constants through logical operations compatible with mathematical procedures grounded in general algebra and set theory. Formal logic is a calculus of different levels of *logical generality* possessed by concepts, and a computation involving the *linguistic variables* in form of words, propositions, predicates, and logical functions expressed in symbolic notation. In this sense, logic branches into the calculus of concepts, the calculus of propositions, the calculus of predicates of the first and second order, the calculus of classes and the calculus of functions.

Every logical form possesses a *specific degree of logical generality* as its quantitative property, which is manipulated within logical calculus through operators,

quantifiers, and rules of deduction. It is necessary to granulate each linguistic variable until syntactic correspondence is achieved between the word, the concept, and the object to which the statement refers. Granulation or unification of variables in logical calculus is always a relation between words, concepts, and objects; it is simultaneously a referential, inferential, and pragmatic mental action. What matters is that the construction of the logical syntax of a proposition and its semantic interpretation lead to the truth value of our statements.

Through its many applications, logic has become paradigmatic for contemporary information and communication technologies, nanoscience, and nanotechnology – fields that shape the social world in which we live today. This is evident in (1) the discovery, description, investigation, and application of the logic inherent in the language of living beings; (2) the understanding and use of logical structures underlying theoretical accounts of natural laws; (3) the uncovering of the logic of social phenomena through political and social processes, culture, and production; (4) the study of logical proofs concerning the nature and existence of supernatural beings and phenomena; and (5) the construction of intelligent machines grounded in knowledge of the architecture of logical systems.

We now inhabit an *ambient of intelligent space*, a society fundamentally grounded in logical and mathematical

knowledge. In such a digital and virtual world, an *intelligent substance* is at work, and things become androized: smart phones, smart cities, smart books, smart classroom boards… The very notion of substance has changed; we live in an era of intelligent substance whose primary quality is logical memory filled with logical functions and and logical algorithms. Logical *semantics*, logical *syntax*, and logical *pragmatics* form a new alliance upon which the logical construction and reconstruction of the world is built.

But already in ancient philosophy, one finds a transition from the *implicit* and hidden activity of the *logos* (λόγοσ) in nature (φύσισ) to the scientific and *explicit* articulation of the logical structures of thought, action, world, and language. Heraclitus' heno-logic, with λόγοσ as the implicit principle of the harmonization of opposites (τὰ ἐναντία) in nature, differs from Parmenides' paraconsistent logic, developed through a hypothetical two-way dialectics expressed in the formula "All is One" (ἕν πάντα εἶναι).

Plato's concept of dia-logic (διαλεκτική τέχνε), with its new understanding of *logos* as one of the genera of beings (ἕν τι γένον τῶν ὀντῶν), introduced the possibility of negation and enabled the formation of dyadic logical structures through the division of genera into opposite species and subspecies. Aristotle's triadic logic, expressed in his theory of syllogism (συλλογισμόσ) and demonstrative science (ἐπιστήμη ἀποδεικτικη),

introduced a new granulation of *logos* into a triadic structure: (1) the structure of being (substratum – attribute relations), (2) the structure of thought (substance – secondary substance relations), and (3) the structure of propositions (subject – predicate relations).

Plato's dialectic and Aristotle's syllogistic both deconstructed the *implicit* ontological unity of the world (πᾶν, κόσμοσ) expressed through the Pre-Socratic concept of *logos*, transforming it into *explicit* logical and semantic structures of propositions about the world, thought, and language. The hidden λόγοσ of nature – accessible only through gnostic intuition – was replaced by explicit inferential structures embedded in the semantics and pragmatics of scientific demonstration.

From the moment G. W. Leibniz formulated logic as *lingua characteristica* and *calculus ratiocinator* (in *Dissertatio de Arte Combinatoria*, 1666), and as these two components were applied across all fields of human knowledge, logic – through its connection with calculus and language – displaced metaphysical foundations from both action and knowledge.

What is *Mystical* (Wittgenstein, *Tractatus*) cannot be said or thought unless it is expressed within the limits of logical functions – tautology and contradiction – that determine meaning, significance, reference, and truth value. Logic no longer speaks of phenomena or para-phenomena possessing *invisible substantiality* (being-in-itself, substance, thing-in-itself, transcendence);

instead, it speaks of objects (factual or logical), their properties, and the relations among them in a *calculable symbolic language* governed by the rules of logical syntax and semantics.

Models of logically possible worlds and logically possible discourses, populated by logically possible objects, are subjected to logically permissible syntactic operations within logically possible models of meaning and reference. What is logically possible is thereby empirically possible, factually possible, positively possible – possible as a construction from a logical atom to a logical molecule.

These possible logical constructions constitute rational descriptions of rational (finite) reality, the domain to which scientific knowledge and scientific consciousness are confined. They are possible as reconstructions and recognitions achieved through analytical deduction and formalization. This forms the basis of the logical construction of the world, which alone grounds scientific knowledge. Logic thus emerges as the equivalent of knowledge itself – as the rational competence to explain causally, since it contains within its structure the very form of causal implication.

By employing formal patterns from mathematics and linguistics, transforming them into logical syntax and semantics, and constructing logical functions through logical operations, logic completes the circle of producing models of everything that can be meaningfully stated

and inferentially constructed. Logic expelled metaphysics from religious argumentation, entered theology, and transformed it into an expert system (*Summa Theologica*) that rationalizes statements of belief[2] far more effectively than metaphysics of revelation or miracle ever could.

The common thread running through all the essays is their treatment of *the logical* within the triangulation of world, language, and thought, regardless of the different vocabularies characteristic of various phases of logic, from syllogistic to symbolic. What is genuinely *the logical* emerges and evolves only within the *Universe of Discourse*, which always refers to some form of reality – natural or virtual.

[2] I understand theology, or theological exegesis, as *an expert system* in which statements of belief are rationalized and rendered intelligible. More specifically, at the philosophical symposium called *Philosophy and Science*, at the philosophical symposium entitled Philosophy and Science, which was held at the Faculty of Philosophy in Sarajevo in April 2005, I am referring to the Christian tradition of theological exegesis expressed in the *summae theologiae* – such as the work of Thomas Aquinas – which emulate the structure of logical summae (*summae logicae*). See, for example, Thomas Aquinas, *Summa Theologiae*, Aquinas Institute, 2017.

1.
IMPLICITNESS OF *LOGOS* AND EXPLICITNESS OF *LOGIC* IN ANCIENT PHILOSOPHY

1 Introduction

The meaning and use of the term λόγοσ (logos) in ancient philosophy undergo a profound transformation – from an intuitive construction of a *unified concept of the world* (φύσισ, κόσμοσ, τό πᾶν) to its reconstruction within *the world of concepts* (discourse, argument, demonstration, conclusion). Heraclitus' ontologically grounded, gnostic conception of heno-logic, understood as the intuitive discovery of hidden harmony (ἁρμονίη ἀφανήσ), hidden *logos*, and the hidden truth of nature (φύσισ), was gradually transformed through conceptual and linguistic granulation into a logical and methodological construction of evidence-based knowledge or science (ἐπιστήμη).

Analytical and demonstrative science (ἐπιστήμη ἀποδεικτική)[3], grounded in Plato's dialectic and Aristotle's

[3] See in Aristotle, ΑΝΑΛΥΤΙΚΩΝ ΠΡΟΤΕΡΩΝ A. 24a11. In: Cooke, H. P., Tredennick, H. (1938). Aristotle. *Categories. On Interpretation. Prior Analytics*. Loeb Classical Library. Harvard University Press, p. 198.

syllogistics, introduced a new form of conceptual granulation (*premises*) and conceptual unification (*conclusions*) within a network of demonstrative propositions or assertions (λόγοσ ἀποφαντικόσ)[4]. Truth, understood as the unhiddenness (ἀ-λήθεια) of Being, became accessible through these structures. In the forms of demonstration (ἀπόδειξισ)[5], demonstrative science, and syllogism (συλλογισμόσ)[6], *logos* – once conceived as a hidden Mind permeating and governing the world – was transformed into a network of propositions (λόγοι, πρότασισ)[7] expressed through affirmation and negation (λόγοσ καταφατικὸσ ἢ ἀποφατικόσ)[8] in the act of "saying something about something" (τί κατὰ τινόσ)[9].

This transformation realized Aristotle's idea of the logical and linguistic visibility – the unhiddenness – of *being as being* (τὸ ὂν ᾗ ὄν)[10], that is, the essence (οὐσία) of beings.

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[4] See in Aristotle, ΠΕΡΙ ΕΡΜΗΝΕΙΑΣ, (De Interpretatione), 17a1-17a7. In:Ibid., p. 120

[5] See in Aristotle, ΑΝΑΛΥΤΙΚΩΝ ΠΡΟΤΕΡΩΝ A. 24a11. In: Ibid., p. 198.

[6] See in Aristotle, ΑΝΑΛΥΤΙΚΩΝ ΠΡΟΤΕΡΩΝ A. 24b20. In: Ibid., p. 198.

[7] See in Aristotle, ΑΝΑΛΥΤΙΚΩΝ ΠΡΟΤΕΡΩΝ A. 24a17. In: Ibid., p. 200.

[8] See in Aristotle, ΑΝΑΛΥΤΙΚΩΝ ΠΡΟΤΕΡΩΝ A. 24-a15, in W. D. Ross (Editor) (1957) . *Aristotle's Prior and Posterior Analytics*. A Revised Text with Introduction and Commentary (Oxford University Press academic monograph reprints) . Oxford at the Clarend Press,

[9] See in Ernst Tugendhat, (2003): ΤΙ ΚΑΤΑ ΤΙΝΟΣ. Eine Untersuchung zu Struktur und Ursprung aristotelischer Grundbegriffe. Munchen, Freiburg: Verlag Karl Alber

[10] For Aristotle, the *First Philosophy* (later known as metaphysics) was a science (ἐπιστήμη) that deals with Being as Being (τὸ ὄν ᾗ ὄν), and with the properties that belong to it as Being (καὶ τὰ τούτω ὑπάρχοντα κατθ᾽ αὑτό), and not as an individual being. M. G. 2. 1003a21. (See in: Seidl, H. *Aristoteles' Metaphysik*. Erster Halbband: Bücher I (A) – VI (E). In der Übersetzung von Hermann Bonitz. Neu

The processes of granulation and unification, or the distribution and integration of the logical structure of propositions across different layers of generality, became the foundation for constructing knowledge and science capable of *speaking truthfully* about the world. Through this development, the Pre-Socratic idea of the Truth of the World as a hidden or crypto-*logos* of nature (φύσισ κρύπτεσθαι φυλεῖ)[11] was replaced by an analytical and calculative orientation of thought toward language – toward terms, propositions, quantifiers, and logical operators – within which the logical and the ontological appear as unconcealed, uncovered, and accessible (ἀλήθεια)[12]. Language reveals thought, and reveals itself, through the logicality (λογικῶσ) or illogicality of its constructions about the world.

In his *On Nature* (Περί φύσεωσ)[13], Parmenides asserted the identity of thought and Being (... τὸ γὰρ αὐτὸ νοεῖν ἐστίν τε καὶ εἶναι)[14], yet he was unable to find a place for not-being (μὴ ὀν) within the system of thought and language as negation. Plato was the first to accomplish

bearbeitet, mit Einleitung und Kommentar herausgegeben von Horst Seidl. Hamburg: Felix Meiner Verlag, 1978, p. 122.). The properties (παθή) of the being are analogous only to the properties of the one.

[11] Herakleitos, B. Fragmente, 123 in Diels, Erster band, 1951, p. 178: Die Natur (das Wesen) liebt es sich zu verbergen / The natur (essence) love to hidde self.

[12] On meaning of the term ἀλήθεια in Aristotle's philosophy see *Index Aristotelicus*. Edidit Hermannus Bonitz. Berolini, A. 1870, p. 31. For interpretation of this term in in Greek philosophy see in Heidegger, M. (2003). Plato's Sophist. Indiana University Press, p. 11: "ἀλήθεια means: to be hidden no longer, to be uncovered. "

[13] Cf. Diels-Kranz, Parmenides: B. Fragmente, p. 227

[14] Cf. Diels-Kranz, Parmenides: B. Fragmente, 3, p. 231

this by claiming that *logos* (*language*) is one of the genera of beings (ἓν τί γένον τῶν ὀντῶν)[15] in which negation ("not-being") has its legitimate role.

Aristotle further transformed this understanding: the term "not-being" does not signify a metaphysical opposite of being, but rather the denial or negation of the presence of a property in an actual being. It may also signify the privation (στέρησισ)[16] of an inherent form that exists only potentially (δύναμιν ὀν)[17] within a substance, and which attains its actuality, form, or purposefulness (ἐντελεχεῖα)[18] only when it becomes an embodied, actual or formed being (ἐνεργεῖαν ὀν)[19].

Pre-Socratic physio-logics (as Aristotle referred to the Pre-Socratic philosophers of nature) contributed significantly to understanding the relationship between the All and the One within the context of the constant trans-

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[15] Cf. Plato, ΣΟΦΥΣΤΗΣ [ἡ περὶ τοῦ ὄντοσ, λογικόσ], 260 a 5-6. In: *Piatonis Dialogi. Secundum Thrasylli Tetralogias*. Recognovit Martinus Wohlrab. Vol. I. Lipsiae in aedibus B. G. Teubneri. MCMII, p. 451. See translation in: *Plato Complete Works*, 1997, p. 283

[16] In Aristotle, στέρησισ means in the ontological sense the absence of a form or property from being, and in the logical sense the deprivation or negation of the predicate belonging to a subject. Cf. Aristotle, Index Aristotelicus. Edited by Hermannus Bonitz. Berolini, A. 1870, pp. 699-700.

[17] See more about term δύναμιν ὀν in Aristotle, Index Aristotelicus. Edited by Hermannus Bonitz. Berolini, A. 1870, pp. 206-208

[18] See more about term ἐντελεχεῖα in Aristotle, Index Aristotelicus. Edited by Hermannus Bonitz. Berolini, A. 1870, pp. 253-254. Aristotle thinks that Being is said in many ways, but the main sense that the term being has is enteleheia: τὸ εἶναι ἐπεὶ πλεοναχῶσ λέγεται, τὸ κυρίωσ ἡ εντελεχεῖα ἐστιν. (ψ. 1. 412 b9)

[19] See more about term ἐνεργεῖαν ὀν in Aristotle, Index Aristotelicus. Edited by Hermannus Bonitz. Berolini, A. 1870, pp. 251

formation of opposites (τὰ ἐναντία) in nature (φύσισ). Heraclitus' *logos* served as his answer – his Principle of Unity – explaining how it is possible that "from All (things), One, and from One, All (things)" (ἐκ πάντων ἓν καὶ ἐξ ἑνὸσ πάντα)[20].

Plato's and Aristotle's conceptions of knowledge (διάνοια) and science (ἐπιστήεμη) transformed the Eleatic formula (ἓν πάντα εἶναι)[21] and shifted the focus toward understanding *the movement of thought* through the method of deconstruction or division (διαίρεσισ)[22] of different levels of logical generality, as well as the construction of formal conceptual positions within propositions (πρότασισ) that constitute inference (συλλογισμόσ) and scientific demonstration (ἀπόδειξισ, ἐπιστήεμη ἀποδεικτικῆ, ἀποδεικτικόσ συλλογισμόσ)[23].

While Heraclitus and Parmenides were concerned with the question "How is All One, and how is One All?", Plato developed a theory of knowledge that addresses this

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[20] Herakleitos, B. Fragmenta, 10 in Diels-Kranz, 1951, p. 153: aus Allem Eine und aus Einem Alles

[21] Plato, *Parmenides*. The "Eleatic formula" is technical term for Parmenides' thesis "Everything is One" (ἓν πάντα) also appears in Zeno, his student, in his thesis "There is no many bings" (οὐκ πολλὰ τὰ ὀντα). In: ΠΛΑΤΩΝΟΣ ΠΑΡΜΕΝΙΔΗΣ. *The Parmenides of Plato*. Edith Introtuction, Analysisi, and Notes by Thomas Maguire. Dublin: Hodgges, and London: Longmans

[22] See in Plato, *Sophyst*, διαίρεσισ (division), 253 c 5. In: *Plato Complete Works*, 1997, p. 275

[23] See in Aristotle, ΑΝΑΛΥΤΙΚΩΝ ΠΡΟΤΕΡΩΝ A. 24a1. In: Aristotle, W. D. Ross (Editor) (1957). *Aristotle's Prior and Posterior Analytics*. A Revised Text with Introduction and Commentary (Oxford University Press academic monograph reprints). Oxford at the Clarend Press, p. 87

problem: "How can the Idea be thought of as One above the multitude of things, and how can the multitude of things be conceptually subordinated to or participate in the Idea?" This was achieved through the dialectical skill of recollection and recognition. Plato employed the concept of participation or inclusion (μετέξισ, μετέχειν) to explain how things (ὀν, πράγμα) relate to Ideas as paradigms (παραδείγμα) through which objects in space and time acquire their form and function (purpose, τέλοσ) . Ideas exist separately from things, in the universe of Ideas. Things participate (μετέχειν) in Ideas[24] when they are actualized or realized in space and time through the activity of the creator or demiurge (δεμιούργοσ).

Aristotle introduced language (λόγοσ, λόγοσ ἀποφαντικόσ)[25] into Plato's framework of knowledge by investigating the various ways in which being can be thought and expressed. He concluded that "Being is said in many ways" (τό δὲ ὀν λέγεται πολλαχῶσ)[26], that is, tenfold – across the categories or predicates – when used in three types of predication (homonymous, synonymous, paronymous). Aristotle applied the same analogy to the

[24] The concept of participation (μετέχειν) of beings in ideas was presented by Plato in the dialogue Parmenides. See Plato, Thomas Maguire (1882). ΠΛΑΤΩΝΟΣ ΠΑΡΜΕΝΙΔΗΣ . *The Parmenides of Plato*. Edith Introtuction, Analysisi, and Notes by Thomas Maguire. Dublin: Hodgges, and London: Longmans.

[25] Aristotle, ΠΕΡΙ ΕΡΜΗΝΕΙΑΣ / *On Interpretation*, 17a1-17a7. On the different uses of the term λόγοσ by Aristotle, see *Index Aristotelicus*. Edidit Hermannus Bonitz. Berolini, A. 1870, pp. 433-437

[26] Aristotle, M 1003 b 5. In: *Aristotle Metaphysics* (1997). A Revised Text with Introduction and Commentary by W. D. Ross. Volume I. Oxford: Clarendon Press.

one: "the one is said in many ways" (τό ἓν λέγεται πολλαχῶσ)[27], just as being is. To say "the one" is to refer to an individual entity, a "this something" (τοδὲ τί)[28].

Through the structure of apophantic *logos*, Aristotle transformed the *implicit (hidden) logos* of the Pre-Socratics into an *explicit semantic* and syntactic framework of ontological, logical, and linguistic structures. Consequently, the concept of truth as unhiddenness (ἀλήθεια) of these structures led to the unhiddenness of the being itself (τὸ εἶναι, τὸ τὶ ἦν εἶναι), that is, the essence (οὐσία) of beings.

With this analogy, Aristotle resolved the question of how the one is the many – now reformulated as "in what ways is one thing said in many meanings" – and how the many is the one. The essence (οὐσία) or the being (τὸ εἶναι) and the essence of an individual being (τοδέ τί) are identical: the essence of beings is in the beings themselves, not outside them in some separate universe of essences.

The being (τὸ εἶναι, τὸ ὄν ἦ ὄν) manifests itself in two fundamental modes: as presence (παρουσία) and as truth (ἀλέθηεια). It appears in every being either as potentiality or as actuality (ὡσ ἐνεργεῖαν ὄν – ὡσ δύναμιν ὄν);

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[27] See *Mi*. 1052 a15-b1. Already in the book (V) ***MD***. 6. 1015 b10 Aristotle states that the One is said in one case κατα συμβεβεκόσ (one by accident) and in the second case καθ᾽ αὑτό (one by its own nature)

[28] Expression τοδὲ τί in Aristotle's works it means ὃ ἄν τοδὲ τι ὄν καὶ χωρίστον a certain being (or as translated by Hermann Bonitz: "ein bestimmtes Seiendes" (*Aristoteles' Metaphysik*, 1978. p. 207)

in every thought as the truth or falsehood of thinking about of the being (ὡσ ἀληθέσ ὄν ⊢ ὡσ ψεῦδεσ ὄν); and in every proposition as a necessary or accidental predicate of being (ὡσ ἴδιον ὄν ⊢ ὡσ συμβεβεκὸσ ὄν). Each of these modes of appearing must share corresponding structures, and these structures must align with one another. This internal correspondence of structures within the triad of world – thought – language secures truth as the unhiddenness (ἀλήθεια) of essence (οὐσία).

2 Heraclitus' Heno-Logic as Conceptual Homologization

Some authors argue that the "earlier, non-Aristotelian configuration of mind" should be designated as archaic (Raymond 1976, p. 1). At the same time, this configuration is not regarded as undeveloped, embryonic, or primitive; rather, its symbolic and graphic dimension is emphasized – its capacity to express opposites within a one-dimensional world and to confer unity upon the constantly changing states of nature. Raymond maintains that "…yet, beyond mere opposition there exists a third term that works between or behind given sets of oppositions" (ibid., p. 1).

The world – thought – language triangulation in Heraclitus' *On Nature* (Περί φύσεωσ) is constructed such that, by grasping the constant transformations produced through the interplay of opposites (τὰ ἐναντία) in the physical world, one advances toward an intuitive

yet objective knowledge grounded in insight – specifically, in listening (ἀκούειν) to the λόγοσ that stabilizes this flux into a unity manifest in the movement of variables. What is constant – what is hidden within the material processes of nature – is no longer material or physical, but cognitive, possessing an objective validity that must be heard (ἀκούειν), and understood (γνωρίζειν). The product of this unity, and of the hidden principle that sustains it, is the realization that *the one is the all* (ἕν πάντα), that the one must be identified (ὁμολογεῖν) with the all and vice versa. Heraclitus' Fragment 50 (DK) directly introduces cognitive homologization as the principle for overcoming physical or material granulation:

> οὐκ ἐμοῦ, ἀλλὰ τοῦ λόγυ ἀκούσανταϲ, ὁμολογεῖν ϲοφόν ἐϲτιν ἕν πάντα εἶναι.
>
> "If you listen not to me but to this *logos*, it is wise to identify the one and the all. "[29]

This wisdom consists in listening (ἀκούειν) – in intuitively understanding the *logos*, the interpersonal intellectual principle that enables one to grasp the one in the all, the principle that governs (*kibernein*) all changes and processes, holding Chaos within the bounds of Cosmos, the world ordered by its action. Heraclitus writes:

> εἶναι γὰρ ἕν τό ϲοφόν, ἐπίϲταϑαι γνώμεν, ὁτέη ἐκύβερνηϲε πάντα διὰ πάντων.

[29] See in Diels-Kranz. *Herakleitos*, B. Fragmente No. 50: Haben sie nicht mich, sondern den Sinn vernommen, so ist es weise, alles sei eins. (Diels, 1951, p. 161).

"Wisdom is only one, the knowledge that should be known, that everything governs everything."[30]

Heraclitus' doctrine rests on the insight that processes in the world occur through the struggle of opposites and must be understood through the conjunction of opposites (διὰ τῶν ἐναντίων συνῆψεν). The transitions of opposites into one another reveal that the world is in perpetual change and flux – πάντα ῥει, everything flows. Yet what makes it possible to understand the world as an ordered whole, as Cosmos rather than Chaos, what grants unity to the world as a unity of opposites, is the *logos*, the measure of all events, movements, and opposing forces. For Heraclitus, the world is an ever-living fire, kindled and extinguished according to the measure established by the *logos*.

According to Heraclitus, there is only "one and common world" (Fr. 89): ἕνα καί κοινὸν κόσμον εἶναι, and this one and common world is governed (Fr. 72) by one and common *logos* (Fr. 2). Listening to a merely personal

[30] See in Diels-Kranz. *Herakleitos*, B. Fragmente No. 41: "Eins nur ist das Weise, sich auf den Gedanken zu verstehen, als welcher alles auf alle Weise zu steuern weiß." (Diels-Kranz, 1951, p. 160). See another translation in *Heraclitus*. Charles H. Kahn (1981): The Art and Thought of Heraclitus. Cambridge University Press, p. 55 : "The wise is one thing, namely, to know [lit. master the insight] how all things are steered through all. Our translation is different: "Wisdom is only one, the knowledge that should be known, that everything governs everything." Heidegger connected the understanding of this Heraclitus fragment (no. 41) with the understanding of fragment no. 64 with which he and Fink started a philosophical seminar on the philosophy of Heraclitus. See in: Martin Heidegger (1980). Heraclitus Seminar, 1966-67. The University of Alabama Press, p. 6

(ἴδιον) *logos* is insufficient for achieving objective understanding or collective agreement.

Sophistics, however, initiated a shift from the common to the interpersonal foundation of knowledge – from *logos* to dia-*logos*. The Sophists effectively began the dissolution of the concept of a universal *logos* by turning inward to the individual's own *logos*, which is engaged in a constant struggle of thoughts in the form of dia-*logos*. Protagoras introduced this new principle with his famous claim: "Man is the measure of all things" (πάντων χρήματων μέτρον ἐστίν ἄνθροποσ).[31]

If Heraclitus spoke of the *common logos* (ὁ κοινόσ) as the measure of truth in the world (τὸ πᾶν), and Protagoras spoke of each individual human being as the measure of how things appear, then we already encounter two opposed conceptions of the criterion of truth.

Jonathan Barnes interprets Heraclitus' *logos*-doctrine and his heno-logic as a doctrine of monism: amid all the

[31] Protagoras, B. Fragnmente 1: πάντων χρήματων μέτρον ἐστίν ἄνθροποσ, τῶν μὲν ὄντων ὡσ ἐστιν, τῶν δὲ οὐκ ὄντων ὡσ οὐκ ἐστιν (Aller Dinge Maß ist der Mensch, der seienden daß (wie) sie sind, der nicht seienden, daß (wie) sie nich sind) in Diels-Kranz, 1951, p. 263, and in Plato's dialogue *Cratylus* (386 a1): "… as Protagoras tells us? He says that man is "the measure of all things," and that things are to me as they appear to me, and are to you as they appear to you." in: *Platonis Dialogi. Secundum Thrasylli Tetralogias*. Recognovit Martinus Wohlrab. Vol. I. Lipsiae in aedibus B. G. Teubneri. MCMII. See translation in *Plato Complete Works*, 1997, p. 103. In Plato dialogue *Theaetetus* (152 a1) "…For he says, you know, that 'Man is the measure of all things: of the things which are, that they are, and of the things which are not, that they are not. ' in *Platonis Dialogi. Secundum Thrasylli Tetralogias*. Recognovit Martinus Wohlrab. Vol. I. Lipsiae in aedibus B. G. Teubneri. MCMII. See translation in *Plato Complete Works*, 1997, p. 169.

changes and dynamics of opposites in nature, there ultimately remains something static – the one – which is conceptual in origin.

> "These four fragments have suggested three abstract theses. First, there is the notorious Theory of Flux: all the furniture of the world is in constant, if imperceptible, change; the cosmos is a battleground, and its pacific façade hides the endless victories and defeats of an interminable internecine strife. Second, there is the Unity of Opposites: behind the coherent surface of things there is a tension of incompatibles; every object, however firm and enduring, is subject to contrary strains, and is constituted by opposing features. Third, there is a doctrine of Monism: in some fashion the diversity of appearances is underpinned or colligated by some single thing or stuff; at bottom, all is one." (Barnes, 1983, p. 45)

3 Parmenides' Paraconsistent Logic

Parmenides' treatise *On Nature* (Περὶ φύσεωσ) survives only in fragments, preserved primarily through the writings of Plato, Aristotle, and later ancient commentators. Although composed in poetic form and rich in metaphor, its ontological and epistemological commitments are stated with remarkable clarity. According to Parmenides, the All (πᾶν) is presented through the metaphor of a perfect, spherical whole (Σφαῖροσ), in which motion (dynamics) and rest (statics) are harmonized in such a way that there is no void, no not-Being – yet paradoxically both motion and rest are present simultaneously. There is only Being, and only Being can

be thought and expressed; not-Being neither exists nor can be thought or spoken, for Being occupies all space and time. Being and thought are identical – one and the same.

The implementation of this thesis in Parmenides takes the form of a paradoxical logic, arguably the earliest instance of what we would now call paraconsistent logic. His logical and methodological position becomes especially visible in Plato's dialogue ΠΑΡΜΕΝΙΔΗΣ [ἡ περὶ τῶν ἰδεῶν]. In Hypothesis 1 (If the one exist: εἰ ἕν ἐστίν)[32], the antecedents of a series of implications lead directly to conclusions that contradict the initial hypothesis. Parmenides' paraconsistent sophistry deliberately exploits confusions between the determinations of being as such (being-in-itself) and the determinations of the one as such (the one-in-itself), on the one hand, and the determinations of space, time, motion, and rest that apply only to individual beings (τὰ πολλά), on the other. These latter determinations belong to particular beings, not to the concept of Being.

In Parmenides' vocabulary, the term ἐόν refers to being itself, not to particular beings that also exist. Being is primordial and the only true *being-as-being* – the one that alone can be thought and spoken. Not-being is not the opposite of being, nor an expression for something false; it is a term without meaning, without referent,

[32] Cf. Plato, Thomas Maguire (1882). ΠΛΑΤΩΝΟΣ ΠΑΡΜΕΝΙΔΗΣ . *The Parmenides of Plato*. Edith Introtuction, Analysisi, and Notes by Thomas Maguire. Dublin: Hodgges, and London: Longmans. p. 19

something that cannot exist, cannot be thought, and cannot be spoken. Already in Heraclitus, and then more radically in Parmenides, the concept of being is identified with the concept of truth. The term ἐόν signifies being as such, not an individual being.

Considering the various forms of the verb εἰμι – the present indicative ἐστι ("is"), the infinitive εἶναι ("to be"), and the present participle ἐόν ("being") – Martin J. Henn (2003, p. 31) concludes:

> "What we find in the poem is more of a primordial monistic theory of Being than a sophisticated ontological system of classification between various modes of Being. "

Equally important is the fact that, for Parmenides as for Heraclitus, the concept of being is synonymous with the concept of truth. The being of beings is their hidden truth. Henn cites Charles Kahn's standard interpretation of Parmenides' vocabulary, which emphasizes precisely this identity of Being and Truth.

> "Charles Kahn points out in his valuable essay "The Greek Verb 'To Be' and the Concept of Being" that "the most fundamental value of *einai* when used alone (without predicates) is not 'to exist' but 'to be so,' 'to be the case,' or 'to be true.'" "Kahn calls this sense of the verb 'to be' its 'veridical usage. ' Kahn's innovation challenges those standard interpretations of Parmenides based on a much later distinction between essence (i. e., *what* a things is) and existence (i. e., the *fact* that a thing is, abstracted from any of its worldly determinations)." (Henn, Ibid.,)

Thus, in the first deduction, the consequences of Hypothesis 1 ("the one is, but does not participate in being") lead to the proof of the opposite hypothesis: that the one, as such, in no way is – οὐδαμῶσ ἄρα Τὸ ̋Εν οὐσίασ μετέχει.[33] In the second deduction of Hypothesis 1 ("the one is, and participates in being"), the consequences – derived by applying antecedents that belong to the one-in-itself rather than to individual beings – again lead to the opposite conclusion: that the one is all things and is not even one – τὸ ἕν οὔτε ἕν ἐστιν οὔτε ἔστιν.[34]

In this way, Parmenides, using dialectic against dialectic – namely, a dialectic that contains no negation and no place for not-being – grounds his proof and his logic in a dynamic staticity that holds together the one and the all within a single circle, the perfect *Sphaîros*, which is simultaneously dynamic and static.

Parmenides thus appears to depart from Heraclitus' scheme of opposites and their unity in heno-logic. Yet by excluding negation in the linguistic – logical sense, and not-being in the ontological sense, the opposites with which he operates in understanding the world – thought – language triangulation become, in effect, paraconsistent claims: that the one exists and does not exist at the same time; that the many exist and do not exist at the same time. For as soon as one attempts to define the one (or the many) through its opposite, it becomes that opposite.

[33] Cf. Ibid., p. 25

[34] Cf. Ibid., p. 35

In Plato's dialogue, Parmenides explains to Socrates the essence of his dialectical method: for each hypothesis, there must be two deductions, each leading through opposite consequences to contradictory conclusions.

"And you are quite right," he (Parmenides) said. "But you must do the following in addition to that: if you want to be trained more thoroughly, you must not only hypothesize, if each thing is, and examine the consequences of that hypothesis; you must also hypothesize, if that same thing is not."

"What do you mean?" he (Socrates) asked.

"If you like," said Parmenides, "take as an example this hypothesis that Zeno entertained: if many are, what must the consequences be both for the many themselves in relation to themselves and in relation to the one, and for the one in relation to itself and in relation to the many? And, in turn, on the hypothesis, if many are not, you must again examine what the consequences will be both for the one and for the many in relation to themselves and in relation to each other. And again, in turn, if you hypothesize, if likeness is or if it is not, you must examine what the consequences will be on each hypothesis, both for the things hypothesized themselves and for the others, both in relation to themselves and in relation to each other. And the same method applies to unlike, to motion, to rest, to generation and destruction, and to being itself and not-being. And, in a word, concerning whatever you might ever hypothesize as being or as not being or as having any other property, you must examine the consequences for the thing you hypothesize in relation to itself and in relation to each one of the others, whichever you select, and in relation to several of them and to all of them in the same way; and, in turn, you must examine the others, both in relation to themselves and in relation to whatever other thing you select on each occasion, whether what you hypothesize you hypothesize as being or as not being. All this

you must do if, after completing your training, you are to achieve a full view of the truth." (Plato, Parmenides, 136 a1-136 c8. In: Plato, 1997, pp. 370-371)

Plato, as a determined opponent of sophistry and the Sophists, demonstrates in the *Parmenides* that two dialectical deductions are possible for each hypothesis – one proceeding from the thesis and the other from the antithesis. In this way, he shows how it is possible to consider a being as a being-in-itself, a being as such, endowed with conceptual determinations that differ from those belonging to an individual being determined by material attributes.

By assigning equal value to the opposites that appear as qualitative determinations of being (part-whole, limited-unlimited, in-itself-in-another, motion-rest, same-different, similar-unlike, equal-unequal, older-younger) Parmenides transforms these oppositions into conceptual characteristics that generate a paradox of deduction in which the individual becomes the universal and the universal becomes the individual. When a proposition and its negation are both true at the same time, a paraconsistent logic emerges.

We will illustrate this procedure using the example of the first hypothesis in Plato's Parmenides.

Hypothesis I (Plato, Parmenides, 137C – 142A)
First Deduction of Hypothesis I

- *Antecedent* of Hypothesis I

If the one (as such) is, and does not partake of the being.

- *Definition* of "to exist":

To exist means to partake of the being. This implies participation in space (form, parts of form) and in time (parts of time).

- *Consequences*:

1. the one cannot be distributed or integrated (it is neither a part nor a whole).
2. the one does not partake of form.
3. the one does not partake of space.
4. the one does not partake of time.
5. the one does not partake of identity (does not partake of genus).
6. the one does not partake of similarity (does not partake of type or quality).
7. the one does not partake of equality (does not partake of quantity).
8. the one does not partake of the being.
9. the one does not partake of perception, opinion, or knowledge.
10. no determination of the being applies to the one.

• *Conclusion* of the First Deduction:

IF the one (as such) is and does not partake of being, THEN

Cc 1. The one in no way partakes of the being (οὐδαμῶσ ἄρα τὸ ἕν οὐσίασ μετέχει)

Cc 1. 1 Therefore, the one in no way is (τὸ ἕν οὔτε ἕν ἐστιν οὔτε ἔστιν)

This yields the paradoxical result: From the assumption that the one is, it follows that the one is not.

Second Deduction of Hypothesis I

• *Antecedent* of Hypothesis I

If the one (as such) is and does partake of the being.

• *Definition* of "to exist" (repeated):

To exist means to partake of the being, i. e., to participate in space (form, parts of form) and time (parts of time).

• *Consequences* :

1. the one can be distributed and integrated.
2. the one partakes of form.
3. the one partakes of space.
4. the one partakes of time.
5. the one partakes of identity (genus).
6. the one partakes of similarity (type, quality).
7. the one partakes of equality (quantity).

8. the one partakes of the being.
9. the one partakes of perception, thinking, and knowledge.
10. the one has properties of a particular being.

• *Conclusion of* the Second Deduction

IF the one (as such) is and partakes of the being,

THEN:

Cc 1. the one is all things and is not even one (ἕν εἰ ἔστι, πάντα τε ἐστι τὸ ἕν)

This yields the opposite paradox: From the assumption that the one is, it follows that the one is all things and not even one.

What we call paraconsistent logic in Parmenides – expressed through a two-way-dialectical procedure that excludes the possibility of thinking or expressing not-being – is described by Constance C. Meinwald as a form of "gymnastic dialectic", a method that necessarily culminates in paradoxical conclusions.

> "The situation regarding Parmenides' gymnastic dialectic is completely different. For although the incidence of grammatical contradictions is much higher and more systematic than in the Socratic dialogues, and many of the individual conclusions are as superficially paradoxical as they could be, there are no expressions of dissatisfaction at these results. The absence of such mention is at its most notable at the end of the dialogue, where Parmenides summarizes the results of the dialogue in a way (quoted previously) that clearly highlights their paradoxical character. Yet the interlocutor not only expresses no

dissatisfaction at this formulation but goes to an extreme in accepting it by means of the superlative form *Alethestata* ("Most true")." (Meinwald, 1991. p. 22-23)

But it is crucial to recognize that Parmenides' dialectic begins with a paradoxical hypothesis: "if the one is, and yet does not partake of the being." This starting point already contains the seeds of contradiction, for it posits existence while simultaneously denying the very condition that makes existence possible.

4 Plato's Dia-Logic as Conceptual Granulation

In the *Sophist*, Plato demonstrates how, in the process of defining terms, thought descends through a structured series of opposites (τά ἐναντία) without employing negation. In his logical directory, Plato begins from the highest genus (γενικοτάτων γένοσ) and proceeds downward by dividing each form (concept) into two subordinate forms (δὺο εἴδη, opposite species), until reaching the final specification of the concept being defined.

This procedure enables orthonymy – the correct naming of beings – but it does not yet provide orthology or orthography, that is, the linguistic and cognitive orthopraxis that recognizes the existence of the term "not-being" and the legitimate use of negation in discourse.

For Plato, opinion and dialogue concerning the world – thought – language triangulation are governed by the dialectical skill (διαλεκτικὴ τέχνη), understood as a

maieutic method of dividing a concept into two forms. Whenever one seeks the determinations of a being or attempts to define a logical form, one must divide a single term (a single logical provision of a given degree of generality) into two subordinate terms – two opposites contained within the superordinate genus. This division (διάρεσισ) is a technique of dialogue, a method of operating within discourse, and a way of acquiring knowledge of the essence of any subject.

Plato's method of "dividing one form into two" (*Sophist*) within the art of discussion (διλεκτικὴ τέχνη) consists in descending from the highest level of logical generality within a genus to the lowest species, and further down to the individual concept. In the *Sophist*, Plato illustrates this method through the question "What is a sophist?" (τὶ ἐστιν σοφίστησ) and, by analogy, through the simpler example (παραδείγμα) of the fisherman (ἀσπαλιευτήσ) and the activity of fishing.

The descent through the tree of attributes – logical granulation – proceeds as follows:

> "So now we're in agreement about the angler's expertise, not be just as to its name; in addition we've also sufficiently grasped a verbal explanation concerning the thing itself. Within expertise as a whole one half was acquisitive; half of the acquisitive was taking possession; half of possession-taking was hunting; half of hunting was animal-hunting; half of animal-hunting was aquatic hunting; all of the lower portion of aquatic hunting was fishing; half of fishing was hunting by striking; and half of striking was hooking. And the part of hooking that involves a

> blow drawing a thing upward from underneath is called by a name that's derived by its c similarity to the action itself, that is, it's called draw-fishing or angling – which is what we're searching for." (Plato, *Sophyst*, 221 b 1. In: Plato, 1997, p. 241)

Everything that can be said about the sophist and sophistic skill can be said more easily and transparently about the fisherman and the skill of fishing. Yet from this example it becomes evident that Plato has transferred the understanding of opposites from the physical domain to the conceptual domain: opposites now appear as conceptual differences within a genus, as logical differentiations between species of the same genus.

Plato constructed his dialectical skill of division on the basis of dichotomy in the form of a problematic syllogism – a syllogism that does not begin from fixed premises but instead asks the interlocutor to choose between opposing claims. The premises of such a syllogism serve as conditions for constructing proofs through the inclusion of antithetical propositions, rather than as necessary and universal premises from which conclusions follow deductively.

For this reason, Aristotle classified Plato's syllogism ("All men are necessarily mortal or immortal") as a weak or asthenic syllogism. Aristotle's own apodictic syllogism rests on universally accepted axiomatic premises ("All men are mortal"), from which the conclusion follows necessarily because the truth of the premises is grounded in

prior knowledge (ἐκ προυπαρχούσησ γίγνεται γνώσεωσ)[35] derived from experience: knowledge that something exists (ὅτι ἔστι)[36] and knowledge of the meaning of the name of what exists as a fact (τί τό λέγομενόν ἐστι)[37].

Hugh Tredennick appears justified[38] in claiming that Plato achieved an advanced form of inferentialism associated with a new understanding of *logos*, but that he did not formalize this approach into a science of dialectical syllogism. The fully developed system of syllogistic figures and modes is authentically Aristotle's achievement.

5 Aristotle's Syl-logistics as Conceptual Reconstruction and Re-cognition

Aristotle established the world – thought – language triangulation as an ontological, conceptual, and linguistic network of corresponding structures. These structures are mapped onto one another so that factual existence, logical thinking, and linguistic expression enter into relations of truth or falsity through their mutual correspondence.

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[35] See in Aristotle, ΑΝΑΛΥΡΙΚΩΝ ΥΣΤΕΡΩΝ-Α, 17a1-71a15, In: Tredennick, H., Forster, E. S. (1960). Aristotle. *Posterior Analytics. Topica*. Loeb Classical Library. Harvard University Press, p. 24.

[36] Ibid., p. 25

[37] Ibid., p. 25

[38] See in Aristotle, ΑΝΑΛΥΡΙΚΩΝ ΠΡΟΤΕΡΩΝ-Α, In: Cooke, H. P., Tredennick, H. (1938). Aristotle. *Categories. On Interpretation. Prior Analytics*. Loeb Classical Library. Harvard University Press, p. 26.

The formal – logical structures of thought must align with the semantic structures of language, while the truth or falsity of the constructions arising within these structures is conditioned by the factual constitution of substance and its properties. From the correspondence of structures within this triangulation arises cognitive content – both in everyday cognition and in scientific demonstration. Knowledge emerges through analytical constructions and reconstructions that employ syllogistic forms of reasoning and proof.

The syllogism (συλλογισμόσ), and especially the scientific syllogism (ἀποδεικτικόσ συλλογισμόσ), is constructed by Aristotle from propositions (protáseis, premises) that function as logical and linguistic linear aggregates. Within these aggregates, terms or concepts of different levels of logical generality are arranged: the major term (terminus maior, genus), the middle term (terminus medius, species), and the minor term (terminus minor, singular term). These terms can be transformed through logical operations – quantification, negation, conversion – into different systems of synonymous and homonymous predication, or modified through changes in quantification or the introduction of modality (modal operators: possible, necessary, accidental). [39]

Jan Łukasiewicz demonstrated that Aristotle's syllogism is, in fact, a form of implication:

[39] See theory of modal propositions in Aristotle *Peri hermeneias* / *On interpretation* (22a25)

> "No syllogism is formulated by Aristotle primarily as an inference; they are all implications having the conjunction of the premises as the antecedent and the conclusion as the consequent. "(Łukasiewicz 1951, p. 2)

Thus, every syllogistic conclusion is the consequent of an implication.

Aristotle introduced a threefold distinction of identity:

(1) Identity by genus (τὸ ἀυτόν)

(2) Identity by species (τὸ ὁμοῖον)

(3) Identity by number (τὸ ἴσον)

On this basis he constructed different types of predication:

(1) synonymous predication (substantial identity),

(2) homonymous predication (qualitative identity),

(3) paronymous predication (analogical identity).

The structure of the world and the structure of knowledge are revealed apophantically in the network of implications or propositions, which serve as semantic forms of logical relations, and in the network of categories, which serve as structural or referential forms. Inferential work proceeds through the laws of thought and rules of deduction, using affirmation and negation, universal and particular quantifiers, modal operators, and other logical tools.

Aristotle's theory of truth as correspondence implies that knowledge and science rest on a formally adequate and materially accurate expression of the relations that

obtain in the state of affairs. The truth of opinions and propositions depends on factual truth. Knowledge (τὸ εἰδέναι, τὸ ἐπιστάσθαι) concerns the first principles and first causes of beings and the manner in which their universal and particular properties belong to them. Understanding (διάνοια) concerns the logical – linguistic formulation of these relations in assertoric, statement-making propositions (λόγοσ ἀποφαντικόσ), in definition (ὁρίσμοσ), and in the construction of scientific demonstration (ἀποδεικτικὸσ συλλογισμόσ).

> "The Aristotelian concept of true knowledge and science (τὸ εἰδέναι καὶ τὸ ἐπιστάσθχαι) rests on the insight that every object possesses a composite (συνκεῖμενα) physical structure – matter, form, the properties of matter, and the properties of form. To attain true knowledge of such an object, one must first discover its first causes and first principles (πρῶται ἄρχαι καὶ πρῶται αἰτίαι), which differ from its merely physical causes and principles. Only then is it possible to understand this physical structure and, within a unified science, to articulate this understanding as a formal structure of the object – one capable of supporting meaningful thought and linguistic construction in the form of theory (ἐπιστήμη, ζετοῦμενη ἐπιστήμη, θχεωρία)." (Ibrulj 2005, p. 158)

Plato's dialectical skill is grounded in the creation of logical dyads – pairs of species (δυὸ εἴδε) generated within a single generic term. By dividing one genus into two opposed species, Plato constructs a dia-logical structure in which conceptual opposites are revealed as internal differentiations of a higher-order unity.

Aristotle's syllogistic, by contrast, is an analytical reconstruction based on the positioning and arrangement of three terms. It is a method of designing logical triads within a network composed of premises and conclusions, where terms are distributed and ordered according to their logical generality. Within this network, terms acquire their quantitative and qualitative determinations through affirmation or negation.

Where Plato granulates concepts by dichotomous division, Aristotle reconstructs them through triadic composition. Plato's dia-logic reveals opposites within a genus; Aristotle's syl-logistics reveals the inferential relations among genus, species, and individual through the structured interplay of major, middle, and minor terms. In this way, Aristotle transforms conceptual granulation into a system of logical re-construction and re-cognition.

"This logical – linguistic construction is in fact an imitation of the ontology of objects, expressed not merely in a semantic statement but in an apophantic one. Every statement is semantic insofar as it signifies something and conveys meaning; yet not every statement is apophantic, for only an apophantic statement is constructed in such a way that its very form shows, indicates, and asserts how properties and objects are related in the physical world". (Aristotle, *Peri Hermeneias*, 17a1). Thus, in the logical and linguistic – grammatical sense, the relation between subject (ὑποκειμένον, οὐσία) and predicate (κατηγορουμένον, δεύτερα οὐσία) is constituted through the apophantic statement. At its foundation lies the structure of the physical object itself, composed of the substrate (ὑποκειμένον, οὐσία)

and the properties (τὰ ὑπάρχοντα, τὰ ἴδια) that belong to it and that it undergoes (ἴδια παθὴ, τὰ συμβεβηκότα)." (Ibrulj 2005, p. 170)

In the scientific syllogism (ἀποδεικτικὸσ συλλογισμόσ), in which propositions are arranged according to the relations among the terms they contain, knowledge arises from grasping the logical relation between the terms that appear in the premises. This relation reveals how properties are integrated with the subject according to the principle of logical affiliation – that is, the inclusion of lower levels of logical generality within higher and more comprehensive ones. The syllogism thus generates knowledge about the belonging of all the properties of an object to the same genus or species.

A property that belongs generically or substantially to an object belongs to it regardless of the category in which it is expressed. This establishes substantial identity, understood as the generic unification of species-properties, and provides the secure foundation for synonymous predication, which necessarily shows that certain properties belong to a given object. It is a powerful mechanism of predicate homologation, ensuring the necessary coexistence of generic predicates.

The introduction of the λόγοσ ἀποφαντικόσ structure into the structure of the syllogism – and the embedding of the syllogistic structure into the inferential architecture of figures and modes – was arguably Aristotle's most innovative achievement. At the very center of

these structures lies the logical relation between subject (ὑποκειμένον) and predicate (κατηγορούμενον), a relation that is logical rather than merely grammatical in origin. As Jonathan Barnes observes:

> "The first and original home of subjects and predicates was logic. More particularly, it was Aristotelian logic; and the distinction between subject and predicate had nothing to do with grammar." (Barnes, 2007, p. 100)

Aristotle understood λόγοσ as a statement or proposition, distinguishing between the significant expression (λόγοσ σημαντικόσ) and the statement-making sentence or proposition (λόγοσ ἀποφαντικόσ) with true value and verb *being* (εἶναι) (*Peri Hermeneias*, 17a7). The apophantic statement[40] is a predicative structure in which two terms of different levels of logical generality are connected in such a way that the broader term encompasses the narrower. In this way, the apophantic form functions as an implication: the antecedent is always universally quantified, while the consequent receives its specific quantification in the structure of the second premise. Aristotle thus created the syllogism as a quantitatively articulated amplification already contained in the universal premise.

[40] The term λόγοσ ἀποφαντικόσ is translated by W. D. Ross as *proposition* (See in: Aristotle Metaphysics. A Revised Text with Introduction and Commentary by W. D. Ross. Volume I. Oxford: Clarendon Press, 1997, p. 50), while J. L. Ackrill translates as *statement-making sentence* (See in: Complete Works of Aristotle. The Revised Oxford Translation. Edited by Jonathan Barnes. Volume One. Princeton / Bollingen Series LXXI. 2. Princeton University Press. 1995)

With this, Aristotle effectively constructed the first logical directory that eliminated the asthenic syllogism used by Plato in dialectical proofs. Plato's weak syllogism placed opposites in the universal premise through an unnecessary negation ("All men are mortal or immortal"). Aristotle's strong syllogism descends the directory on only one side – on the side of synonymy – which secures orthonymy, orthology, and orthography in the conclusion ("All men are mortal").

Aristotle recognized that the logical division of forms in a syllogism must begin from the division of the implication into antecedent and consequent, rather than from the mere listing of opposite concepts. The categories enable the formation of lógos – the statement-making proposition – but logical relations of subordination and subsumption arise only through the construction of such propositions. Once these logical relations are established within the proposition, the proximate genus is immediately determined, and it is from this genus – not from the highest possible genus – that the division of concepts must begin.

6 Conclusion

In Pre-Socratic philosophy, an implicit concept of λόγοσ emerged, expressed through a metaphorical vocabulary that used symbolic language to articulate the existence of opposites in nature and the possibility of grasping their unity within an ordered world – the kosmos. This

implicit and hidden λόγοσ in Heraclitus functioned as the static principle of unity within all change: permanent, unalterable, and governing all things. Its dynamization began in Parmenides' hypothetical dialectic, which exposed antithetical forms in the attempt to conceptualize the paradoxical relation between the One and the Many. Every attempt to ontologize these opposites led thought and the being into paradox or paraconsistent logic. In this way, Parmenides employed a hypothetical and antithetical dialectic to isolate the being and the one, securing their primordial static position as the conceptually guaranteed eternity and immutability of nature, albeit with a dynamic semantic structure.

Thus, the concept of λόγοσ – its meaning and its use in ontological, logical, and epistemological discourse (the world – thought – language triangulation) – underwent profound transformations in ancient philosophy. From an early worldview preoccupied with movement and change in nature (φύσισ), structured through opposites (τά ἐναντία), λόγοσ entered the architecture of dialectical thinking as the movement of concepts and the organization of conceptual opposites. With Aristotle, it flowed from nature and thought into language as the site of *apophantic disclosure of truth*, expressed through formal laws and rules that govern correct thinking and correspond to reality.

Plato liberated Parmenides' semantic conception of λόγοσ, which was "two-way semantic" due to the exclusion

of not-being and negation from thought and expression, by introducing a logical syntax of concepts into the dialectic of Ideas. Not-being acquires its legitimate place and function in thought once λόγοσ is understood as a genus of beings whose generic concepts divide into opposite species and subspecies. In this way, dialectic becomes the logical syntax of being and thinking, manifested in language as dia-*logos*. This opened the path for Aristotle to ground the ontological and logical aspects of "what is" (ἔστιν, εἶναι) in the logical pragmatics of language, uniting the semantic and syntactic dimensions of being – not in the form of dialectical syllogism (διαλεκτικόσ συλλογισμόσ), but in the form of demonstration (ἀπόδειξισ) and demonstrative science (ἐπιστήμη ἀποδεικτικῆ) as articulated in the epistemology of his *first philosophy* (πρώτη φιλοσοφία).

Thus, in the historical movement of understanding λόγοσ, its dialectical (Plato) and syllogistic (Aristotle) transformations emerged from its ontological form in Heraclitus and Parmenides' heno-logics, through its logical and linguistic reconstruction in the form of inference and proof – the fundamental structures of knowledge and science. This transformation also reshaped the concept of knowledge itself: from direct intuitive listening or insight (ἀκούειν) into the One and the *common logos* as the principle of unity in the ordered world (κόσμοσ) of nature (φύσισ), to the rational construction of a world of concepts in thought and language that refer to the world. Everything Heraclitus and Parmenides

discovered in nature as opposites (τὰ ἐναντία) and their unity had to be deconstructed by dialectical and syllogistic reason in order to be conceptually reconstructed in knowledge and science. In this way, the world – thought – language triangulation became cognitively and rationally understood, not merely intuitively grasped.

In this process, not only the concept of λόγοσ changed, but also the deeper ontological and logical structure of the understanding of nature and its true causes – the para-aesthetic causes underlying all other causes (the first causes and first principles of the being). Pre-Socratic philosophy (*physiology*) was radically transformed by Aristotle into *first philosophy*, later known as *metaphysics*, which re-described nearly all the concepts of early philosophical thought that Aristotle classified as physiology. In the λόγοσ ἀποφαντικόσ, the statement-making proposition, all structures of "what is" (τῶν ὄντων) and "what is said" (τῶν λεγόμενων) become explicit. In Aristotle's *first philosophy*, the world – thought – language triangulation is revealed in science as an axiomatic deduction corresponding to the factual structure of the being.

Within this triangulation, the concept of λόγοσ functions as a *hidden common harmonizer* that connects all three structures and enables truth as the unity of opposites – whether in Heraclitean heno-logic, Platonic dia-logic, or Aristotelian syl-logistics. λόγοσ does not lose its role after Heraclitus; rather, it expands through the granulation of logical structures that leave the

domain of physical substratum (φύσισ, ὕλη) and enter the domain of conceptual substance (πρώτη οὐσία) through dialectical and syllogistic articulation. In every case, λόγοσ is what holds together the formal structure of thought and language and connects it to the structure of material substance and its properties. This connection is expressed as correspondence – the principle by which Aristotle defined the concept of truth.

τὸ μὲν γὰρ λέγειν τὸ ὂν μὴ εἶναι ἢ τὸ μὴ ὂν εἶναι ψεῦδοσ, τὸ δὲ τὸ ὂν εἶναι καὶ μὴ ὂν μὴ εἶναι ἀληθέσ. (*Aristotle,* M. IV. 7. 1011b26)

"*To say of what is that it is not, or of what is not that it is, is false, while to say of what is that it is and of what is not that it is not is true.*" (Ross, 1963, p. 2288 / Translated by W. D. Ross)

τῶ γὰρ τὸ πρᾶγμα εἶναι ἢ μὴ εἶναι, τούτω καὶ ὁ λόγοσ ἀληθὴσ ἢ ψευδὴσ εἶναι λέγεται… (*Aristotle*, K. 4b8)

"*For it is because the actual thing exists or does not exist that the statement is said to be true or false, …*" (Barnes, 1991, p. 8 / translated by J. L. Ackrill)

In this way, the ontological structures of the "*logos* in physis" became the factual grounding for the truth of logical and linguistic structures from which knowledge and science were built. This marked the first great transition – from Truth as an ontological principle to truthfulness as a property of propositions. The elimination of factual evidence and ontological grounding in the form of the "one-*logos* in physis" would occur later

in symbolic and mathematical logic, where the connection between thought, language, and being is no longer secured by the structure of nature but by the internal formalism of symbolic systems.

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2.
NEW REMARKS ON THE CONCEPT IN LOGICAL USE

1 Introduction

Formal logic, both in its historical (traditional, theoretical) forms and its modern (developmental, practical) applications, constitutes the central component of *Logical Science*. It is this component that renders logic an autonomous philosophical and scientific discipline with its own principles, vocabulary, and domain of inquiry. As such, it remains independent of other philosophical disciplines – such as cognitive theory (*Gnoseology*), epistemology, and analytical philosophy – as well as from philosophical (ontological) and scientific (epistemological) systems, including transcendental logic, speculative logic, hermeneutic logic, and phenomenological logic.

Ancient formal logic (Aristotelian syllogistics) and modern formal logic (symbolic and mathematical logic) differ in several essential respects: 1) the type of language in which logical forms and operations are expressed, 2) the nature of logical operations or logical calculus, 3) the type of axiomatization and the degree of formalization of logical deduction, and 4) the rules of derivation from axiomatic statements.

Ancient formal logic is only partially formalized, whereas modern formal logic is a fully formalized system of inference and proof.

The capacity for logical thinking, reasoning, and demonstration has always been highly valued – both in practical decision-making and problem-solving, and in the construction of complex philosophical systems and scientific theories. This is especially evident today, in an era shaped by logical programming, artificial languages, and artificial intelligence. Yet the remarkable power attributed to logical competence stands in stark contrast to the simplicity and small number of fundamental logical laws and rules required to reach valid conclusions and proofs.

Curiously, the number of logical errors (Bennett, 2012) that arise in the formulation and explication of concepts, and in the construction of arguments, far exceeds the number of logical laws and rules that must be mastered for formally correct inference. This is because many logical errors do not stem from mistakes in logical structure alone, but also from errors in the linguistic formulation of arguments, as well as from intentional attempts to construct deceptive argumentation.

This logical minimalism regarding conventional "logical tools" is grounded in the assumption that logical operations are, at their core, simple *intellectual operations of the human mind* (Boole, 1854: 6). These include the *inclusion* and *exclusion* of elements within a class, the

subordination of concepts under broader concepts, the *subsumption* of objects under concepts (Frege in Patzüg, 2008, 49), adherence to logical laws, the application of a limited set of logical rules, and respect for the inherent properties of logical relations.

Logical ability is frequently associated with, and compared to, mathematical ability – both in geometry and in algebra or arithmetic. Numerous logical operations are based on operations from general algebra or on operations involving sets, classes, and functions. Mathematical language is often regarded as the clearest and most precise medium for expressing the hidden processes of the physical world and the forces that shape its forms. Through mathematical language, it becomes possible to construct models of worlds that are not accessible to sensory observation, yet whose possible existence is supported by mathematical description. However, mathematical language itself rests on the simplicity and clarity of the logical matrix underlying every mathematical construction. In fact, the "logical matrix is the matrix that contains no constants", consisting solely of variables; its clarity lies precisely in its generality (Whitehead & Russell, 1997, xxxi). Conversely, all of mathematics can be derived from a small number of logical laws and rules (Russell, 1996). This brings us back to the initial point: logic must be transparent, uncomplicated, clear, and precise – a simple foundation from

which primitive concepts (*axioms*) can generate remarkably complex intellectual structures.

In this sense, logic functions as a simple "grammar" of a simple language with a limited and finite vocabulary, yet capable of producing an infinite number of linguistic constructions. Logic thus appears as a deep grammar of the mind, operating – or ideally operating – across all vocabularies (logical, descriptive, deontic), providing them with a normativity that can be "algorithmically decomposed" (Brandom, 2008: xvii). A decisive shift in the development of logic occurred with its complete formalization, made possible by this *logical grammar*, which displaced traditional linguistic grammar. Within this framework, the key categories are the sentence, the term, and the functor (Anderson & Belnap, 1990, 474). Logic, understood in this way, becomes an axiomatized and formalized system for deriving conclusions and proofs from previously established premises or theses. It excludes naive metaphysical constructions and prohibits logically impossible formations, whether in thought or in language.

The logic of natural language – its semantic constructions and syntactic structures – differs fundamentally from the logic of a pure sign language (Wittgenstein's *Zeichensprache*) or a conceptual language (Frege's *Begriffsschrift*), both modeled on the paradigm of arithmetic notation.

In syllogistic logic, predication in form of *genus* – *species* – *differentia specifica* – *properties* is based on

categorical schemata of concepts with different degrees of logical generality plus the verb *to be*. In contrast, symbolic and mathematical logic determine objects through set membership, employing combinatorial deduction involving variables, functions, quantifiers, and logical operators. Nevertheless, both natural-language logic and sign-language logic arise from the human capacity to represent and identify statements in natural and symbolic languages. Formal logic therefore encompasses both, enabling translation between natural-language formulations and canonical symbolic notation.

This article proposes a new approach to understanding the basic logical form known as *the concept*, arguing that it must be defined differently within syntactic, semantic, and pragmatic models of logical use. Crucially, the notions of truth and meaning differ significantly across these models of formal logic.

2 The Concept in Traditional Logic: A Cognitive-Theoretical Approach

Traditional logic defines a concept as "a thought about the essence of the object thought about" or as "a set of essential features or essential characteristics of an object. "This definition, however, requires careful reconsideration.

For example, the concept "Tiger" is supposedly "the thought of the essence of a tiger". Yet the word "Tiger" does not, by itself, indicate whether it refers to an

animal species, a type of car tire, an adhesive, a military unit, or a German heavy tank. Similarly, the concept WATER and the concept KWATER – in Putnam's *Twin Earth* thought experiment (1973, 1975) – would, under the traditional definition, immediately express the essence of their respective substances. But this is clearly problematic.

The term "Triangle" may refer to the essential properties of "a geometric figure with three angles", but it may also denote a relational configuration among three persons, as in a "marriage triangle".

Traditional definitions fail to account for the fact that a concept is a *compression of logical generality*, and that the "essential characteristics" of an object form a network of concepts appearing in the predicative part of its definition. As Frege argued (*Über Begriff und Gegenstand*), a concept (*Begriff*) is always a predicate (Frege in Patzüg, 2008: 48), and must be granularized or unified through quantification.

Conversely, the object of thought is a compression of ontological generalities, distinguished from its universality through spatiotemporal and terminological indexing.

The fact that a concept can itself become an object of thought – just as a word can become the subject of description in a meta-language – shows that *concept*, *object*, and *word* form a triadic compression of logical, ontological, and linguistic generalities. None can be defined in

isolation; they must be understood in their triangulated interaction.

Traditional theories of the concept (psychological, vulgar-materialist, and realist) assume a strict separation between objects, concepts, and terms. It is trivially true that these differ as elements of spatiotemporal, intellectual, and linguistic domains. Yet in knowledge – whether theoretical description, linguistic expression, or the thought-content underlying both – nothing remains singular once cognition begins.

Knowledge is a structured relation among logical, ontological, and linguistic generalities, governed by laws that ensure non-contradiction. Every thought is a cognitive and logical construction at some level of generality, expressed through a term or symbol. Every concept is part of a thought, but not every concept expresses the essence of what is thought about.

A term expresses the essence of an object only when it possesses the highest degree of logical generality (the genus) attributed to that object. A thought may express an observation, belief, or idea without expressing the essential properties of the object, property, or relation involved.

Only when a concept forms part of a definition does it express the essence of the object of thought. Otherwise, it is a mistake to equate concepts with definitions or with sentences.

Some concepts express essential characteristics; others do not. A word taken in isolation, without syntactic connection or predication, is not a concept in the logical sense. Aristotle already noted that isolated expressions such as "run," "win," or "sit" do not express the essence of running, winning, or sitting. They denote states, actions, or processes. Only when running is defined as "a type of movement of a living organism in space" does the predicative part express the essence of running.

Further analysis reveals that every concept stands upon a network of concepts at different levels of logical generality. Thus, a concept may be understood as a network or compression of logical generalities, ranging from the highest genus to the singular concept involved in perceiving and expressing an individual object.

3 The Concept in Modern Logic: A Calculable Logical Entity

According to the traditional view, a concept is "the thought of the essence of what we think", or "the thought about the essence of the object of thought", or "the thought of the essential characteristics of the object we think about". In short, it is the thought by which we think a thought. Thus, for example, the concept "logic" is taken to be a thought concerning the essential characteristics of logic.

However, already in Aristotle's Posterior Analytics (Book II. 89b23), we find a clear differentiation among

the objects of scientific knowledge, based on the types of questions we ask (τὰ ζητοῦμενα):

(1) whether something is the case (τὸ ὅτι) – the question of fact;

(2) why something is the case (τὸ διότι) – the question of reason or cause;

(3) whether something exists (εἰ ἔστιν) – the question of existence, and

(4) what something is (τί ἐστιν) – the question of essence.

To this we may add Porphyry's distinction concerning linguistic usage: the difference between *how a term is used* in ordinary discourse and *how a concept functions in logical analysis* (πώσ λέγεται, τὸ σημαινόμενον) – that is, the question of meaning (Porphyry, *Isagoge* 2. 5 – 2. 6, 2008).

A word or term that refers to something and names it as an existing entity does not thereby provide a definition of that entity, nor does it immediately express its concept or the thought of its essence. This is why the word "logic" does not, by itself, provide a definition, a concept, or a thought about the essence of logic.

This raises an important question: Can we possess a concept of something whose existence we do not know, and whose nature we cannot yet determine? Consider the term KWATER. If KWATER is to function as a concept – i. e., as a thought about the essence of the object KWATER – we must first determine:

1. whether an object, substance, or entity named KWATER exists, and
2. what KWATER is, that is, which essential characteristics define it.

Without identifying the essential properties of the entity KWATER and distinguishing them from irrelevant ones, we cannot possess the concept KWATER. This seems to imply that a concept is identical with a definition – *nomen est omen*. Yet a *definition is a judgment* that determines the content of a concept, and a judgment is certainly not the same as a concept.

If we do not know whether the object of thought exists, and if we do not know the meaning of the word by which we name it, then we cannot know what that object is, nor can we have a thought about it. Under such conditions, no theory of concepts – materialist, psychological, nominalist, or otherwise – can be coherently applied.

For the moment, it is sufficient to state: the thought of the essence of an object is its definition, and a definition is a judgment, not a concept. A concept is neither the object itself nor its definition.

A concept is a simple (undefined) or complex (defined) component of thought-content, possessing a certain degree of logical generality. This degree of generality corresponds, on the one hand, to the ontological generality of the object, and on the other, to the linguistic generality of the expression by which the object is designated.

Thus, whether singular or abstract, individual or general, a concept is shaped by the specific or essential characteristics of the object, and by the linguistic form through which the object is represented in discourse.

4 The Concept as a Variable Part of Thought

A concept constitutes the cognitive content of a logically ordered structure of thought. Within this structure, it occupies a specific syntactic position (or role), possesses a determinate degree of logical generality (a calculable property), and exhibits a semantic form (semantic disposition) through which it refers to the object it represents.

Whether a concept is adequately formed – and whether the logical structure of thought is properly constructed – depends on its capacity to represent accurately the ontological structure of the object to which it refers, as well as on the adequacy of the semantic expression that designates that object.

A concept is always a part of a thought, but not every thought has the formal structure of a definition. A sentence such as "Logic is a philosophical discipline" does not express the essence of logic; it expresses only one segment of the thought concerning the essence of logic, even though it contains three concepts. The same applies to statements such as "Aesthetics is a philosophical discipline" or "Ethics is a philosophical discipline". Each expresses a thought at a particular level of logical

generality, but only as a partial component of a more comprehensive conceptual structure.

Each of these thoughts contains two concepts, yet what we seek is the primitive (undefined) component of thought that functions as the subject-term. Only when we specify the domain or subject matter of each of these philosophical disciplines do we arrive at their definitions.

The definition becomes complete only when we introduce the differentia specifica – the predicative component that determines the variable concept. For example, logic concerns the true, aesthetics the beautiful, and ethics the good. Consequently, we cannot possess the concept of logic, aesthetics, or ethics until we have their definitions: the nearest genus to which they belong and the specific difference that distinguishes each.

A concept is thus a structured logical content of an object of thought. It is a component of thought that possesses a particular level of logical generality, marked by a specific logical form. It constitutes an integral part of the definition of the essence of things – objects, properties, facts, states of affairs, or other objects of thought – and its logical generality is variable.

We may think about a single object of thought in multiple ways: in one logical category (or matrix) differently than in another. We may determine its essence, its quality, its quantity, its relation, and so forth. But our conceptual grasp of what we know to exist – and of what

we know something about – is fundamentally different from our conceptual grasp of what we do not know to exist, or whose nature is unknown.

For example, we know what the word WATER means, and we possess the concept of the substance WATER. Experience confirms the existence of the substance designated by that term, and we understand the meaning of the word that denotes it.

A term is a historically (epistemologically) and contextually (pragmatically) variable linguistic and logical representative of an object of thought within statements that can be meaningfully formed about it.

A concept, by contrast, is a component of the whole conceptual content of thought – expressed linguistically together with a logical operator indicating a certain (quantified) degree of logical generality – and stands in relation to a physical object or object of thought that possesses a corresponding degree of ontological generality.

5 Calculative Properties of the Concept

Every concept possesses its own content, which essentially determines it. A concept is a constitutive component of thought, while thought itself is the distributed content articulated through the concepts from which it is constructed. Conceptual content is a part of the total content of thought, and the total content of thought is composed of the content encompassed and delimited by the concepts that constitute it.

The fact that the conceptual content of one thought is qualitatively and quantitatively distinct from other conceptual contents within the same thought indicates that a concept is a specific segment of the overall conceptual structure. This further implies that each conceptual content has its own quantitative and qualitative determinacy, even when represented by a variable – when its "essential characteristic" is unknown and its meaning or content remains to be determined.

This quantitative determinacy of a conceptual segment within the construction of a thought corresponds to the scope of a concept. The scope need not be semantically defined or known; by quantifying the conceptual segment (through universal or existential quantification), the domain of linguistic content is delimited.

Because each concept is a component of thought-content with its own degree of logical generality, its own field of application, its own position within the ordered structure of thought, and its own relational possibilities with other conceptual components, the concept – through its content, scope, and range – acquires calculable properties relevant to judgment, inference, and proof. Accordingly, we must distinguish:

a) *the content of the concept*

The internal structure of conceptual content within thought. This is the qualitative component that determines what the concept expresses.

b) *the scope of the concept*

The intra-conceptual inferential structure: the subordinate conceptual components, the lower-level concepts falling under a higher concept, and the intension of the concept. This is a syntactic property.

A term possesses a degree of logical generality derived from its position within a hierarchy of concepts. Its structural properties indicate whether it stands in a relation of subordination or superordination.

c) *the range of the concept*

The extra-conceptual referential structure: the individual objects subsumed under the concept, the extension of the concept, and its semantic relation to things, facts, or states of affairs.

A concept is simultaneously part of the intra-conceptual content of thought and part of the extra-conceptual referential structure through which thought relates to reality.

d) *the categorical form of the concept's use*

The pragmatic operability of the concept in categorical assertions – affirmations or negations.

This concerns the pragmatic properties of the term: the manner in which it is applied and the role it plays in statements with assertoric force.

The concept possesses not only calculability within formal symbolic logic – where universal, existential, and singular quantifiers are applied – but also a calculable

structure open to the use of generalized quantifiers in natural-language discourse and natural deduction. As Jouko Väänänen (2011: 283) notes, natural languages contain a wide variety of generalized quantifiers whose logical functions differ from those of the universal and existential quantifiers. Examples include:

Two-thirds of citizens voted in favor.

Exactly half of the funds remain for distribution.

Most of the Sarajevo fans wanted to leave the stadium.

Some but not all liked the performance of the composition.

Between 10% and 20% of those present were students.

Hardly any of the guests touched the cake.

The number of white balls is **even**.

There are infinitely many prim numbers.

There are countless many things that are different.

In logical calculus, such quantifiers resemble temporal, epistemic, or situational operators found in modal and non-classical logics more than the dichotomous quantifiers of classical two-valued logic.

A methodologically correct formulation of concepts, judgments, and inferences in formal logic requires clear quantification – either granulation or unification – of

variables within a logical matrix. Only then can their content and scope acquire calculative properties.

6 Conclusion

This discussion has distinguished between syllogistic logic and symbolic logic in their respective approaches to valid logical forms, particularly regarding the status of the concept. Syllogistic logic is only partially formalized: it does not formalize entire statements but only the constitutive elements of premises and conclusions – namely, the concepts (terms) from which they are composed. For this reason, syllogistics may be described as a calculus of concepts or a calculus of terms.

In syllogistic logic, the factual truth of the premises determines the type of syllogism: *apodictic syllogisms* follow from axiomatic premises, while *dialectical syllogisms* follow from premises of a probabilistic nature. Consequently, the definition of a concept in syllogistic logic is tied to cognitive-theoretical principles governing the nature of thought expressed in the premises and its correspondence to the facts on which their truth depends. Syllogistic logic is therefore a *referential model of logical predication*, and this referential character shapes its understanding of the concept.

Symbolic logic, by contrast, is fully formalized and axiomatized. Its premises, expressed through symbols and formulas, possess no meaning beyond the truth-values assigned to them. Computation is performed on whole

statements rather than on concepts, and what is calculated are the truth-values of these symbolic expressions. Symbolic logic is thus an *inferential model of logical predication*, and this inferential orientation significantly influences its conception of the concept. Here, the concept must be understood through its calculative logical properties, since it functions as a component within the calculative structures of whole statements.

The logical meaning of a concept, therefore, should be determined by its *calculative properties* – those structural features of conceptual content that enable its use in inference. A concept possesses an internal logical structure composed of its degree of logical generality, its interactive relations within the total conceptual content of a thought, and the logical operations that may be performed upon it.

The degree of logical generality determines the position and role of a concept within the sequence of conceptual components that constitute the structure of thought. *The calculative properties of a concept* include the relations of subordination and subsumption into which a term may enter according to its level of generality.

A concept is a component of a definition and a component of a thought, but it is not itself a definition. Therefore, a concept cannot be identified with a thought about the essence of the object of thought.

That the concept possesses calculative properties by its logical nature is further demonstrated by the possi-

bility of quantifying the very structure of thought – that is, by applying quantifiers through which the term, as a variable, is more precisely determined. *A concept is a cognitive variable, a component of a logical matrix* in which no constants exist until its meaning is understood (semantically grasped), that is, until the object represented by the term is defined within the logical structure of thought.

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3.
SOME CHARACTERISTICS OF REFERENTIAL AND INFERENTIAL PREDICATION IN CLASSICAL LOGIC

1 Introduction

Immanuel Kant holds that general logic is a formal discipline concerned with the rules of thinking as such. It is discursive and analytic a priori, because it considers the form of conceptual thought independently of the way in which thought relates to objects (*Gegenstände*). Since it does not investigate how concepts can be applied to what is given in sensibility, general logic cannot provide any knowledge of objects and therefore cannot serve as a foundation for metaphysics as a science.

By contrast, transcendental logic examines the conditions under which concepts can relate to objects that are given in sensible intuition (*Anschauung*). It does not consider thinking in general, but thinking insofar as it can relate to appearances. Only transcendental logic can show how the pure concepts of the understanding (the categories) are objectively valid, that is, how they can be legitimately applied to what is given in sensibility.

Kant's fundamental principle states: "Thoughts without content are empty, intuitions without concepts are blind." (Kant, 1976, 94 – 105). This expresses the necessity of the unity of concept and intuition for the possibility of experience, and thereby for the possibility of scientific knowledge.

The synthesis of the a priori concepts of the understanding (*Verstand*) with the objects given in sensible intuition is the central task of transcendental logic, and it is to be secured through the transcendental deduction. Yet a fundamental difficulty arises when we turn to the transcendental ideas of reason (*Vernunft*): how could one perform a transcendental deduction of these ideas, or synthesize them with objects, if they correspond to no possible object of experience? Since the ideas of reason lack any constitutive relation to appearances, they cannot be deduced in the same manner as the categories. Their proper domain is therefore not empirical intuition but the sphere of possible experience as a regulative ideal, that is, the domain in which discursive practices are guided by the demand for systematic unity grounded in the transcendental apperception. Synthetic a priori judgments do not function as referential discourse about independently given concepts; rather, they operate as inferential and schematic structures whose objective validity depends on the formal unity of concept and intuition secured by the imagination under the "I think" (*Ich denke*) that must be able to accompany all representations.

However, Kant's transcendental logic – conceived as the foundation of transcendental philosophy and as the basis for transforming metaphysics into a strict science (indeed, into a logic "on the right path of science") – was eventually displaced by the emergence of a new kind of logic, a logic " with a few drops of pragmatic oil" which came to be regarded as an ideal within the philosophy of the Vienna Circle. A common definition reduces the entire field of logical science (*Wissenschaft der Logik*) to the claim that "logic is the science of constructing correct conclusions in reasoning and valid proofs in demonstration". In this view, "concepts", "judgments", and "inferences" are treated as "forms of valid thought" that participate in the construction of definitions and proofs. Frege's requirement that propositions, in addition to sense (*Sinn*), must also have meaning (*Bedeutung*), and that meaning is actually the true object (*Gegenstand*) of judgment (*Urteil*), and the object is actually the truth value of the entire conceptual content, which depends on the truth value of the concepts that make up the parts of thought, introduced the logical *concept of reference*: judgment became an implication (antecedent-consequent) as the calculative unity of all truth values (conditions) possessed by parts of conceptual content without reference to objects of sensory experience.

Yet logic, although an autonomous philosophical and scientific discipline, depends in its application on two major fields: the science of language – semiotics

(syntax, semantics, pragmatics) (Carnap, 1948, 8–9) – as the medium in which logical forms are expressed, and mathematics (algebra, arithmetic, set theory, function theory), which provides the operational structures applied to logical forms (Boole 1854; Peano 1889; Frege 1879; Russell 1900; Hilbert 1930).

The reduced definition of logic would be adequate only if mathematics could be reduced to general algebra – "the science of exact solutions to mathematical problems" – and linguistics to grammar – "the science of correct sentence formation". Yet logic, mathematics, and linguistics have entered into a productive alliance that gave rise to formal semantics, formal syntax, and formal pragmatics, marking the emergence of experimental philosophy and scientific epistemology, later integrated into the epistemological strategies of analytic philosophy and philosophy of science.

Like mathematics and linguistics, logical science is a complex and historically developed discipline. There is no single, concise definition that captures all aspects of logical inquiry, all the ways logic engages with its objects, or the possibility that logic itself becomes the subject of its own investigation in metalogic. Moreover, any systematic body of knowledge organized around a research subject must satisfy basic logical principles, must operate within the horizon of logic, and must remain compatible with it.

Every rational human action – and every automated action of artificial intelligence systems (automata, machines, expert systems, robotics) – operates under *the principle of the logical* (Ibrulj, 1999, 187 – 214), which directs and orients action toward a goal that is the logical (algorithmic) consequence of prior steps or prior claims. Likewise, any description of logically dependent events or processes tends to be formulated within a metalogical framework. For these reasons, the definition of logic must be approached gradually, through preliminary characterizations of its field of inquiry, its subject matter, its principles, its applications, its vocabulary, and its role in scientific theories and philosophical systems.

Logic is the science that establishes laws and procedures of varying complexity corresponding to objects of varying complexity. In logic, norms and rules determine how logical forms should be constructed, transformed, and operated upon so that the resulting expressions possess determinate truth-values. Logic investigates objects called logical forms or logical relations between components of conceptual content, and it does so through their linguistic-grammatical representations (symbols) and the relations among them. Logic is therefore a heuristic, descriptive, and normative science, dependent on ontological and epistemological assumptions, and cannot be fully defined without integrating both its theoretical and practical dimensions.

Logic may thus be described as the science concerned with:

- characterizing the predicate *logical* for statements containing at least one logical operator (and, or, not, if, if and only if), or statements exhibiting negation, conjunction, disjunction, implication, or equivalence;
- characterizing the predicate *true* for statements containing logical constants and variables (e. g., F(x), or statements involving truth-values;
- investigating, describing, and revising *conceptual schemes* and logical-grammatical categories (epistemological aspect, descriptive metaphysics);
- examining the origin and application of valid forms of thought (critical aspect);
- analyzing the semantic and syntactic structure of logical systems (linguistic-grammatical aspect);
- determining the type and existence of entities to which symbolic notation refers (formal-ontological and formal-semantic aspects);
- discovering the basic laws of thought and applying them in processes of formalization, substitution, and quantification (methodological-deductive aspect);
- verifying the claims of non-philosophical sciences (methodological-inductive aspect);
- conducting contextual analysis of symbolic systems (pragmatic-semiotic aspect);
- translating natural-language expressions into the canonical notation of artificial languages.

From all this, it follows that logic concerns not only valid forms of thought and their application, but also the ontological and epistemological assumptions underlying them (Dewey, 1938), as well as the inferential, referential, and pragmatic models of logical pragmatism within the epistemological strategies of philosophy and science (Ibrulj, 1999).

2 Logic as a Calculus with Words in Natural Language

The traditional approach to logic begins from the assumption that logic is an exclusively philosophical discipline concerned with correct inference – that is, with the study of valid forms of thought and their application in constructing arguments and proofs. In contemporary contexts, however, logic is often reduced to a calculus: either to formal monotonic logic as the basis of argumentation in natural-language environments (soft computing, computing with words, *fuzzy logic*), or to formal symbolic logic expressed in artificial notational systems (*crisp logic*).

The development of epistemology and cognitive science – cognitive psychology, computational linguistics, computer science, and informatics – together with the emergence of multivalued logic (Łukasiewicz, 1963), modal logic (Kripke, 1972), fuzzy logic (Zadeh, 1968), logic programming, computing with words (Zadeh, 1987), and soft computing, has shifted the scientific study of

cognition toward empirical and computational models. These disciplines now investigate cognitive processes, the construction of definitional procedures for objects (entities) in homogenized and hybrid contexts (Rieger, 1999), and the functioning of logical and linguistic competence in humans.

Rational and linguistic competence in intelligent systems – animals, humans, and machines – is now studied experimentally in relation to neurobiological processes (John R. Searle, Patricia Churchland), mental symbol-manipulation (Jerry Fodor, Paul Churchland), and computational architectures, rather than solely through introspective or hermeneutic methods.

The traditional approach to logic may be described as dichotomous, because it treats the existence of objects of cognition (subject-matter and subject-form) as entirely independent from their conceptual or intellectual existence (logical content and logical form), as well as from their linguistic representation (linguistic content and linguistic form. This approach generated the fundamental dichotomies of traditional logic and epistemology: substance vs. accident, subject vs. predicate, form vs. content, a priori vs. a posteriori, analytic vs. synthetic, empirical vs. transcendental, particular vs. universal.

This understanding of logic emerged from the close connection between logic and metaphysics in the pre-Socratic, Platonic, and Aristotelian traditions. Logic was conceived as an organon, a tool for deducing

consequences from metaphysical principles – principles about which logic itself could say nothing. Metaphysics was responsible for discovering first principles and first causes (Aristotle, *Metaphysics*, 982a33), while logic was responsible only for deriving conclusions from these truths. Thus metaphysics was the "first philosophy", physics the "second philosophy", and logic merely the instrument of deduction (Aristotle, *Prior Analytics*; *Posterior Analytics*).

Metaphysics also included the science of proof (analytics, syllogistics, apodictics), which investigated the formal causes of truth in propositions. As the "first philosophy", metaphysics provided all sciences with knowledge of first causes and first principles of being – that is, knowledge of *being as being* (τὸ ὄν ᾗ ὄν) (Aristotle, *Metaphysic*s, 1003a21). Ontology, as onto-theology, established the structure of being, and logic was tasked with mapping that structure into its own categories using concepts and terms (Aristotle, *Categories*). This metaphysical conception presupposed a system of *veritative being*, in which the truth of a statement corresponds to the necessary existence of what it asserts, and necessary existence corresponds to the truth of the statement asserting it. Within this framework, the concept was defined as the valid thought of the essence of what is thought. Necessary or accidental existence of an object and its properties was expressed in traditional logic as necessary or accidental predication – synonymous

or homonymous attribution of a predicate to a subject (Aristotle, *Categories*). Thus the ontological distinction between what exists by necessity and what exists by accident was mirrored in conceptual and linguistic structures. Traditional logic was therefore an integral part of essentialist, metaphysical epistemology, in which the central aim was the logical grounding or justification of true knowledge. A thought or statement was true if it could be logically justified – that is, if it could be derived from a set of true premises by valid rules of inference. Proof consisted of constructing a chain of propositions that follow from one another without appeal to sensory experience or individual particulars.

In this framework, the definition of a subject is essentialist. A definition is a judgment that determines the content of a concept by answering the question *ti estin* – what (something) is, or what its essence is. This presupposes that the object possesses its own substance (οὐσία) or timeless *first substance* (πρώτη οὐσία), and that the meaning of the word simply expresses that essence. This tight connection between object, concept, and linguistic meaning led to semantic paradoxes such as the Liar Paradox: when a Cretan says, "All Cretans are liars", the statement becomes both true and false. In this sense, the notion of formal logic (syllogismos) is conditioned by the understanding of relations among parts of thought expressed in natural language. These relations are construed as those between antecedent and

consequent, standing in a cause-and-effect structure. Logical analysis thus involves constructing, reconstructing, or deconstructing parts of thought according to relations of *subsumption* (objects under concepts) or *subordination* (narrower concepts under broader ones). Formal logic may therefore be defined as the formal relation among components of conceptual content, whose parts can be divided into units with different levels of logical generality: the narrowest (individual, ὄν, οὐσία, ἄτομοσ, ἕν), the intermediate (species, εἶδοσ), and the widest (genus, γένοσ). Within a sentence or judgment (λόγοσ, λόγοσ ἀποπφαντικόσ), these take the position of subject in linguistic predication or substrate in metaphysical predication. Because formal rules govern the composition of this content and apply universally, the truth obtained through valid manipulation of these components is called logical or formal truth.

3 Partial Formalization of Logic: Syllogistic Logic

The Aristotelian system of inference (syllogismos) and demonstration (apodeixis) constitutes a partially formalized logical framework grounded in:

- formal-logical principles or laws of thought,
- the formal-logical differentiation of the concept of identity,
- the predicative schematism of concepts that structure judgment,

- a quantified scheme of logical predication,
- the logical relations of subsumption and subordination,
- the logical operations of affirmation and negation, and
- the logical schematism of predication.

Formal-logical principles (*archai*) or laws of thought function as standards governing the formation and use of thought-forms in both intuitive-practical and scientific-theoretical contexts, whether expressed in natural or artificial languages. Their purpose is to ensure the consistent and non-contradictory formulation of simple and complex thoughts, whether affirmative or negative, and to regulate the homologation of predicates relative to a given subject.

Logical laws are not laws of nature (Frege). They are logical truths, rules, or generalizations that make it possible to:

- derive valid and correct inferences,
- deduce conclusions from given premises, and
- obtain correct, valid, and true conclusions.

Although different authors have understood these principles differently, traditional logic recognizes four fundamental laws of thought:

- (PID) the Principle of Identity, expressed as A = A or A is A; in modern notation, $p \equiv p$.

- (PC / PNC) the Principle of Contradiction (or Non-Contradiction), expressed as $\neg(p \wedge \neg p)$.
- PEXM / PEXT) the Principle of Excluded Middle, expressed as $p \vee \neg p$.
- (PSR) the Principle of Sufficient Reason.

These principles are static generalizations or constructive schemata of comprehension, judgment, and inference – analogous to natural laws that generalize physical processes. This raises important questions: Do logical laws change? Can new standards arise? Do only their applications or notational forms evolve?

Logical principles may be characterized according to the domain of their application and the nature of the objects to which they apply – whether existent entities or virtual (subsistent) entities. Their characterization thus involves:

(1) an ontological dimension,
(2) a formal-logical dimension,
(3) an epistemological dimension,
(4) a linguistic-grammatical dimension, and
(5) a logical-mathematical dimension.

- *Formal-Logical Differentiation of Identity*

Syllogistic logic distinguishes three types of identity, each generating a distinct predicative scheme: synonymous, homonymous, and paronymous predication.

Identity Type 1: Same Genus

Things belong to the same genus when they share the same essence (ὧν μία ἡ οὐσία) (Aristotle, Metaphysics 1021a10). In this scheme, subject and predicate are synonymous: they share a common generic name and therefore the same definition. For example, all living beings fall under the genus "animal", though they are not physically identical (e. g., human and ox).

Identity Type 2: Same Species

Things belong to the same species when they share the same quality of essence (ὧν ἡ ποιότησ μία). Here, subject and predicate are homonymous: they share a species-name but do not belong to the same genus and do not share the same definition.

Identity Type 3: Same Number

Things share identity of number when they possess equal quantity (ὧν τό ποσόν ἕν). In this case, subject and predicate are identical only with respect to numerical equivalence.

Logical operations differ across these types of predication. In synonymous predication, apophantic affirmations and negations yield necessary consequences; in homonymous predication, consequences are merely probable or accidental.

• *Logical Relations of Subsumption and Subordination*

Subsumption is the logical operation by which an individual object falls under a concept – its inclusion within

a type or class. Subordination is the logical operation by which one concept is placed under a higher, more general concept. This relation is determined by the hierarchy of logical generality: narrower concepts fall under broader ones.

• *Logical Operations of Affirmation and Negation*

Affirmation (τί κατά τινός) is the apophantic attribution of a property to a subject, either wholly or partially. Negation (τί ἀπό τινός) is the apophantic denial of a property to a subject, either wholly or partially.

• *Logical Schematism of Predication*

The syllogistic conception of truth and validity is grounded in predicative schemata that articulate relations between:

- a subject and its first-order properties,
- a predicate functioning as a subject and its second-order properties,
- or analogous paronymous structures.

The type of syllogistic schematism depends on the type of identity underlying the predication. Three basic predicative schemes structure the syllogistic system and enable inference and proof.

Syllogistic logic is thus determined by the predicative form of judgment and inference. Synonymous and homonymous predication differ in their categorical and inter-categorical schemata (Aristotle, *Categories* 1a1 – 15).

- *Synonymous predication* is vertical, continuous, and governed by subordination among genera and species.
- *Homonymous predication* is horizontal, discontinuous, and involves subsumption across categories where predicates do not fall under one another.
- *Paronymous predication* is analogical: from the property "bravery" comes "brave", from "grammar" comes "grammarian", from "philosophy" comes "philosopher".

4 Syllogistics in the Figures of the Components of Judgments: The Calculus of Terms (Concepts)

The logical-linguistic apparatus of the syllogism – Aristotle's system of indirect deductive inference – is presented in the Prior Analytics (*Analytica Priora*). The schematism of the premises, from the standpoint of quantity (major and minor), depends on their degree of logical generality: one premise is always universal. The arrangement of terms within the premises follows a fixed structure: each syllogism contains three terms, two of which function as predicates (genus and species), while one is an individual term. The species (eidos) serves as the middle term, and according to Aristotle, it is the cause of the truth of the conclusion.

• *Elements of the Syllogistic Structure (Judgments)*

MP – Major Premise (Universal Premise, U-Premise)

mP – Minor Premise (Particular Premise, P-Premise)

C – Conclusion (the logical result of the calculus)

• *Elements of the Structure of Syllogistic Premises (Terms / Concepts)*

S – Subject / Minor Term (TERM 1)

M – Middle Term / Predicate-1 (TERM 2)

P – Major Term / Predicate-2 (TERM 3)

The classical table of syllogistic figures displays the relational structure among these three terms, distributed across two premises and a conclusion. The subject (minor term) is always narrower in scope than the middle term, which in turn is narrower than the major term. Thus, the subject is defined through two predicates of broader extension: the minor predicate and the major predicate. This arrangement constitutes the complete predicate model of deduction in Aristotelian logic.

Aristotle's key to interpreting the predicate structure of the syllogism lies in the mode (tropos) that expresses how one term is contained within another:

1. as a part contained within a whole – a vertical, generic inclusion,
2. as a whole related to another whole – a structural correspondence.

A second interpretive key is the mode of identity on which the predicate scheme is constructed, corresponding to the three Aristotelian types of identity previously discussed.

• *Functional Roles of the Three Terms*

Minor Term (S) – the subject of the conclusion (T1)

Middle Term (M) – the term appearing in both premises (T2)

Major Term (P) – the predicate of the conclusion (T3)

The middle term is the pivotal element of the syllogism: it links the subject and predicate of the conclusion and provides the explanatory ground for the inference. Through the arrangement of these three terms across the four figures of the syllogism, Aristotle establishes a formal calculus of terms – a system in which the validity of inference depends entirely on the structural relations among concepts.

	I.		**II.**		**III.**		**IV.**	
Major Premise	M	P	P	M	M	P	P	M
Minor Premise	S	M	S	M	M	S	M	S
Conclusion	S	P	S	P	S	P	S	P

The table below illustrates the relationships among three terms that differ in their levels of logical generality – that is, in their scope. The symbol < indicates that the term on the left possesses a lower degree of logical

generality than the term on the right. A term of lower logical generality is always included within a term of higher logical generality. The general relational scheme among the three terms can therefore be expressed as follows:

T1 < T2 < T3 > T2 > T1

	I.	II.	III.	IV.
Major Premise	T2 < T3	T3 > T2	T2 < T3	T3 > T2
Minor Premise	T1 < T2	T1 < T2	T2 > T1	T2 > T1
Conclusion	T1 < T3	T1 < T3	T1 < T3	T1 < T3

5 Two presentations of syllogistic figures in the form of "Aristotle's Sudoku"

1 2 3 2 1
S < M < P > M > S

I	Barbara	Celarent	Darii	Ferio		
MP	M > S	M > S	M > S	M > S		
mP	P > M	P > M	P > M	P > M		
C	S < P	S < P	S < P	S < P		
II	**Cesare**	**Camestres**	**Festino**	**Baroco**		
MP	P > M	P > M	P > M	P > M		
mP	S < M	S < M	S < M	S < M		
C	S < P	S < P	S < P	S < P		
III	**Darapti**	**Datisi**	**Disamis**	**Felapton**	**Ferison**	**Bocardo**
MP	M < P	M < P	M < P	M < P	M < P	M < P
mP	M > S	M > S	M > S	M > S	M > S	M > S
C	S < P	S < P	S < P	S < P	S < P	S < P

IV	Bramanti	Camenes	Dimaris	Fesapo	Fresison
MP	P > M	P > M	P > M	P > M	P > M
mP	M > S	M > S	M > S	M > S	M > S
C	S < P	S < P	S < P	S < P	S < P

Here it is clearly shown how the three terms in the premises and in the conclusion of the syllogism relate to one another in terms of the logical relations of inclusion and exclusion – that is, in terms of the logical relations of subsumption and subordination.

$$S < M < P > M > S$$
$$T1 < T2 < T3 > T2 > T1$$

I	Barbara	Celarent	Darii	Ferio		
MP	2 > 1	2 > 1	2 > 1	2 > 1		
mP	3 > 2	3 > 2	3 > 2	3 > 2		
C	1 < 3	1 < 3	1 < 3	1 < 3		
II	**Cesare**	**Camestres**	**Festino**	**Baroco**		
MP	3 > 2	3 > 2	3 > 2	3 > 2		
mP	1 < 2	1 < 2	1 < 2	1 < 2		
C	1 < 3	1 < 3	1 < 3	1 < 3		
III	**Darapti**	**Datisi**	**Disamis**	**Felapton**	**Ferison**	**Bocardo**
MP	2 < 3	2 < 3	2 < 3	2 < 3	2 < 3	2 < 3
mP	2 > 1	2 > 1	2 > 1	2 > 1	2 > 1	2 > 1
C	1 < 3	1 < 3	1 < 3	1 < 3	1 < 3	1 < 3
IV	**Bramantip**	**Camenes**	**Dimaris**	**Fesapo**	**Fresison**	
MP	3 > 2	3 > 2	3 > 2	3 > 2	3 > 2	
mP	2 > 1	2 > 1	2 > 1	2 > 1	2 > 1	
C	1 < 3	1 < 3	1 < 3	1 < 3	1 < 3	

The traditional interpretation of the syllogistic figures is grounded in the schematism of the relationship between subject and predicate across the two premises and the conclusion. In each figure, three concepts of different logical generality – genus, species, and individual – are arranged according to the relations of subsumption and subordination.

The middle level of logical generality is occupied by the species (eidos), which mediates between the genus and the individual. The species is encompassed by the genus and inherits all of its essential properties, while at the same time it encompasses and determines the individual.

The functional roles of the three terms within a judgment are defined by the positions they occupy:

Minor Term (S) – Subject of the conclusion
Middle Term (M) – The term that appears in both premises
Major Term (P) – Predicate of the conclusion

The position of the middle term is decisive for deduction because, as Aristotle emphasizes, the middle term is the cause of the truth of the conclusion. In the premises, all three terms (major, middle, minor) may appear either as subjects or predicates. However, in the conclusion only two terms can appear: the minor term must occupy the position of the subject, and the major term must occupy the position of the predicate. The middle term never appears in the conclusion.

Aristotle's key to constructing the mode of a syllogism lies in analyzing the relations among the components of statements that possess calculative logical properties:

- the degree of logical generality (genus, species, individual, property of a species, property of an individual),
- their roles as subject or predicate,
- the logical relations of subsumption and subordination, and
- the logical operations of affirmation and negation.

By applying these structural elements, the figures and modes of the syllogism are systematically generated.

The following relations define the fundamental logical behaviors that terms may assume within the Aristotelian predicate scheme:

- to function as a subject (ὑποκειμένον) or as a predicate (κατηγορούμενον) in a relation of subsumption.
- to function as a predicate (κατηγορούμενον) while occupying the syntactic position of a subject (ὑποκειμένον) in a relation of subordination.
- to function as an attribute (κατηγορούμενον) in the position of an attribute predicated of a subject that is itself an attribute.
- to be contained in the subject – to be expressible of the subject.
- to be an individual, a species, a genus, or a differentia.

- to be a genus subordinate to another genus (vertical differentiation of genera).
- to be a genus not subordinate to another genus (horizontal differentiation of genera).

- *Rules for Interpretation According to the Form of the Predicate Scheme*

A syllogistic mode is interpreted according to the type of predication that structures its premises:

- *Synonymous predication*
  (serial, vertical, generic predication;
  homologous predication)

This structure expresses necessary belonging and corresponds to definitional relations. It is characteristic of cases in which the predicate belongs essentially and necessarily to the subject.

- *Homonymous predication*
  (parallel, horizontal predication)

This structure expresses accidental belonging and corresponds to the division of a genus into species or the attribution of properties that do not belong essentially to the subject.

6 Complete Formalization of Logic: Symbolic Logic

The modern approach to logic begins from the thesis that logic is a scientific discipline fundamentally identical with mathematics (Boole, Peano, Frege, Russell), both in its procedures and in its laws. More recently, logic has also been identified with the pure logical syntax of language (Carnap, 1937, xiii), expressed through artificial symbolic languages that enable logical programming and computational implementation.

Within this framework, mathematics – constructed on axiomatic systems (Hilbert, 1930) – is regarded as an advanced form of logic. Indeed, the entirety of mathematics can be reduced to a small number of basic logical laws (Russell, 1905) or to a finite set of logical procedures (algorithms). Since every natural science, upon reaching a certain level of theoretical maturity, must articulate its axiomatic foundations (Hilbert 1970, 156), each science necessarily requires logic as its syntax or, more precisely, as its scientific language (Carnap 1937, xiii).

In the modern logical paradigm:

- a term is treated as a symbol (simple or complex),
- a judgment or statement is treated as a function (Frege 1879),
- truth is understood as the truth-value of a statement or a set of related statements,
- proof is conceived as a formal system, algorithm, or procedural structure,

- validity is defined as the consistency of a set of statements, and
- truth of propositions is understood in terms of coherence.

This approach is grounded in the scientific investigation of logical procedures for problem-solving, decision-making, and rational choice. Logical syntax becomes the language of science (Carnap 1937), and artificial symbolic languages serve as tools for expressing increasingly complex logical generality. The logical operations that govern these symbolic representations constitute a substantial part of mathematical derivation. For this reason, any adequate definition of logic must include not only a philosophical but also a scientific characterization.

This modern approach may be described as unifying or non-dichotomous: it integrates formal logic with formal semantics and thereby enables the construction of formal-logical entities – a formal ontology – within which semantic paradoxes disappear under rigorous interpretation.

Consequently, the traditional distinctions between objects, concepts, and terms lose their earlier metaphysical significance and are transformed into questions concerning the semantic and structural properties of formal deductive and inductive systems.

The theory of natural classes – central to the metaphysical conception of logic and to the formulation of traditional logical categories – and the theory of sets – central to the symbolic and mathematical conception of logic and to the formulation of transcendental categories – have both been superseded by the theory of virtual classes, which has become fundamental to the computational conception of logic. This development marks the transition from interpreting formal systems through object-bound variables to interpreting variables substitutively as virtual classes (Quine, 1986, 72).

The modern approach to logic understands formal logic as the unity of formal semantics and formal ontology, since it investigates valid inference and proof by formalizing entire statements (symbolic systems of representation), rather than merely terms, as in traditional logic (Frege, Russell, Wittgenstein).

A new, mathematical (symbolic) logic emerged from Gottlob Frege's conception of the Begriffsschrift ("concept-script"), his discovery of the calculus of propositions and the calculus of predicates, and his treatment of statements as functions. Bertrand Russell, Ludwig Wittgenstein, Rudolf Carnap, Alfred Tarski, and later Willard Van Orman Quine made decisive contributions to the development of this new logical framework.

This conception of logic is embedded within a different epistemology – naturalistic epistemology. Within this epistemological framework, the truth of a thought

or assertion is justified if it can be grounded in past experience of an object, fact, or process, and if it coheres with a network of beliefs sharing the same logical form. Such beliefs are connected through stable inferential patterns that link causes and consequences in the cognition of objects, properties, facts, and states of affairs.

In the modern approach, the definition of a subject is functionalist. A definition is a judgment that determines the use of a concept. It answers the question of how something functions within an empirical environment and how it relates to other empirical concepts.

Correspondingly, a new conception of meaning has emerged: "the meaning of a word is its use in the language" (Wittgenstein, 2009, 25e §43). Modern symbolic or mathematical logic, as a method for avoiding and resolving semantic paradoxes arising in object language, has developed formalized systems of interpretation, translation, and paraphrase that map expressions of the object language into expressions of a meta-language.

Hierarchies of formalization emerged as relations between pure and descriptive syntax, within which the logical, the linguistic, and the ontological are harmonized at different levels of generality. These levels correspond to increasingly formalized systems that translate variables into constants and transform open expression-schemata or expression-functions into statements endowed with meaning and significance – that is, with truth-value.

Logical ability is the formal capacity to manipulate symbolic structures that represent components of the logical content of a thought or a complex conceptual whole. In practice, this capacity is expressed as logical calculus – calculation by means of logical forms. Conclusions and proofs are understood as valid calculations performed on symbolic representations (symbols, notations, signs) of conceptual content. They are constructions of logical functions governed by laws and rules that establish relations among parts of thought (concepts) and among complete thoughts (judgments, statements).

Each logical form is defined by its capacity to function within a broader calculative procedure (calculations, computations, inferences, inferential transformations). A logically valid form of thought – whether concept, judgment, inference, or proof – possesses the following properties:

- univocity,
- a determinate truth-value,
- integrability,
- distributability,
- a specific degree of logical generality,
- translatability into another logical form while preserving truth-value,
- the ability to assume and interchange the roles of subject and predicate,
- the capacity for formal construction, reconstruction, and deconstruction (formation, transformation, expansion, and reduction).

7 Logical Function as the General Form of Predication

In syllogistic logic, the central role in inference and proof was played by the judgment (*logos apophantikos*), which affirms or denies that a property belongs to a subject. The quantity and quality of the premises, together with the positions of subject and predicate, determined the formal derivation of the conclusion. Deduction was thus predetermined by the structure of the premises, which fixed the positions of the terms and their logical relations.

Symbolic logic, from its inception, removed judgments and their subject – predicate structure from the logical calculus. It replaced them with the mathematical form of the statement as a logical function, consisting of an argument and a predicative component, both of which are equally subject to quantification and to the determination of their semantic and syntactic properties.

The reduction of logical statements in symbolic logic transformed judgments into logical functions – symbolic constructions composed of elements that occupy specific positions and roles (constants or variables) and possess operational properties (logical constants). As a result, all referential or semantic properties disappeared from the logical calculus, and the syntactic and structural properties of symbols and operations came to the forefront. Logical reasoning became the inferential construction of conceptual content and its translation or reconstruction

into alternative symbolic formulas through equivalent operations (e. g., expressing disjunction by conjunction and negation, or expressing conjunction by disjunction and negation).

Thus, the predicative form ceased to be semantic and became purely syntactic. It no longer depended on subordination and subsumption but on the calculable properties of symbols and their structural representation. This shift introduced procedures for determining (granulating or unifying) logical variables through quantification in atomic or complex logical functions. In symbolic logic, the predicative form is a logical function through which the calculus of propositions, the calculus of predicates, the calculus of classes, and the calculus of relations are carried out.

The equivalence of logical formulas functions as the modern concept of identity in symbolic logic. Symbolic logic radically transformed the Aristotelian notion of identity – and the predication based upon it – by replacing generic identity and synonymous predication grounded in genus – species relations with a syntactic concept of identity. This shift enabled logical identity to be understood as syntactic equivalence or as the tautological equivalence of symbols.

As a result, genus, species, and individual identity – understood as semantic or referential relations between things and the words that designate them – disappeared from the logical calculus. In their place, symbolic logic

introduced identity as the equivalence of symbols (*x* means the same as *y*), where different symbolic expressions denote the same conceptual content or the same inferential structure. Such equivalences provide valid proofs without any reference to empirical givens.

Symbolic (mathematical) logic made possible the development of artificial intelligence, artificial languages, and automated deductive systems, thereby becoming a foundational instrument of modern technology based on logical programming.

8 Truth-Value as the Meaning of Symbols

In symbolic logic, the meaning of words is irrelevant, because the expressions of natural language are reduced to symbols, and entire sentences are represented by symbolic formulas. The only meaning a symbol possesses is the truth-value assigned to it within a deductive procedure. A symbol stands for a proposition that is either true or false, and these truth-values are what the logical calculus computes.

The factual or material truth of the propositions represented by symbols is not determined by logic itself but by the empirical sciences. Logic determines only the formal truth-value – the truth that follows from the structure of the symbolic system, not from the empirical world.

• ***Extended Characterizations of Logic***

According to Heinrich Scholz (1961, 172), symbolic (mathematical) logic possesses several crucial characteristics that distinguish it from earlier forms of formal logic, such as Aristotelian syllogistics or Stoic propositional logic. The following points paraphrase and summarize these distinctions:

1. Symbolic logic is the first stylistically pure form of formal logic, dealing exclusively with pure forms of thought, free from any psychological content of consciousness.
2. Symbolic logic is the first exact formal logic, because:
   a. it precisely defines its axiomatic foundations with the same clarity and rigor as mathematics;
   b. it clearly specifies the rules by which propositions and concepts are derived from axioms;
   c. through symbolic notation, its propositions achieve the same precision as mathematical expressions;
   d. unlike non-symbolic logics, which can only formulate statements, symbolic logic can formalize them;
   e. it can express non-Aristotelian syllogistic rules through symbolic notation;
   f. it can explain the internal mechanisms of syllogistic inference;

g. it provides the first exact analysis of the copula in different types of statements from the standpoint of inferential rules;

h. it offers the first precise analysis of existence as a predicate of individuals, properties, and relations.

3. Symbolic logic is the first formal logic developed strictly synthetically, progressing methodically from simple to complex forms.
4. Symbolic logic is the first complete formal logic, providing the full set of inferential rules necessary for the development of modern mathematics.
5. Symbolic logic is the first experimental logic, investigating systems of syllogistic rules that differ from Aristotle's.
6. Symbolic logic liberated logic from psychologism, ontologism, and evidential intuitionism, grounding logical validity in formal systems rather than mental or metaphysical assumptions.
7. Symbolic logic precisely analyzed the techniques of negation, creating forms of statements in which negation applies exactly to the element being denied.

9 Toward a Broader Characterization of Logic

Given the complexity of logical science and the fact that formal logic represents only one of its reduced aspects, only preliminary characterizations of the notion

of logic can be offered. "Logic," understood within the context of logical science, is a multivalent term (Ibrulj, 2005) that encompasses:

(1) *Intuitive logical ability*

The natural human capacity to use thought-forms embedded in natural language and to adjust semantic content to appropriate logical structures. This intuitive competence allows speakers to avoid contradictions and tautologies in everyday discourse.

(2) *Calculative skill*

The ability to use the formal features of rational language, applying logical operations (addition, multiplication, distribution, integration) to subjects and predicates or to entire statements, transforming them into well-ordered symbolic structures expressible as formal implications in a meta-language.

(3) *Scientific investigation of ideal thought-objects*

Logic studies the discovery, formation, transformation, and use of ideal objects of thought – logical forms – of varying complexity and generality. These include concepts, judgments, inferences, definitions, proofs, contexts, theories, and theoretical models.

Different levels of generality correspond to the representational scope a logical form may assume as a variable within a theory. Logic is therefore the science that investigates:

- hierarchies of complexity among logical objects,
- hierarchies of languages (notations) used to characterize them,
- hierarchies of operational techniques applied to them.

(4) *Techniques for characterizing truth-values*

Logic provides methods for determining the truth-value of different types of logical forms:

- some are unconditionally true (primitive),
- some are conditionally true (one-sided),
- some are biconditionally true (two-sided),
- some are multivalently true (polyvalent).

(5) *A scientific tool of natural and social sciences*

Logic enables sciences to construct networks of analytical hypotheses and derive theoretical statements that form consistent theoretical systems through quantification, substitution, unification, and inductive integration.

It provides the formal language through which sciences axiomatize their research.

It is independent of reference and extension; its variables are interpreted only substitutively.

(6) *An artificial programming language*

Logic underlies the procedures of technical systems based on artificial intelligence algorithms, non-monotonic reasoning, and new forms of negation (e. g., negation-as-failure) used in logic programming.

(7) *A philosophical discipline*

Logic provides a critical and analytical idiom for interpreting and re-interpreting the epistemological and ontological assumptions of theories.

The "logical" depends on the chosen idiom – ontological, mathematical, or pragmatic – and is embedded in the language of theory, in the totality of statements formulated about its subject.

Here we have outlined seven distinct ways of characterizing logic, each highlighting a different aspect of the logical as its proper subject. In the simplest terms, logic concerns the characterization of (1) thoughts or conceptual content, (2) the statements in which such content is expressed or articulated, and (3) the claims these statements make regarding the existence or non-existence of states of affairs or facts.

The methods by which logic engages with these subjects are equally diverse. Logic identifies valid forms of thought (logical forms), determines their degrees of generality, and establishes the rules and laws governing their formation and transformation into other forms of higher or lower generality.

Conception (the formation and explication of concepts), judgment, inference, and proof are not independent domains but manifestations of logical methods and techniques – instances of the correct or incorrect application of logical laws, principles, and rules to the logical forms under consideration. Through these methods,

logic enables the construction, reconstruction, and deconstruction of everyday discourse, scientific theories, and philosophical systems.

10 Conclusion

Logical science can be reduced and simplified to the formal knowledge of manipulating concepts, conceptual relations within statements, and operations on concepts and their properties only because logical forms possess a calculative capacity – a capacity that includes both quantitative and qualitative aspects of operations and logical relations. When taken in this reduced sense, logical science becomes identical with formal logic (syllogistics, propositional logic, predicate logic), supplemented by systems of quantification.

Ontologically oriented logic – the referential model of logic – such as Aristotelian syllogistics, rests on a complex interplay of three types of identity and three types of predication. This partially formalized system, exemplified in the apodictic syllogism, is grounded in a correspondence theory of truth: the truth-conditions of the conclusion are determined by the structure and arrangement of the premises, while the truth-conditions of the premises themselves depend on an extra-logical notion of truth as correspondence between judgments and empirical facts. The meanings of the premises are the meanings of the terms, which function as names of subjects or as descriptions of predicative properties.

Symbolic logic – the inferential model of logic – requires the complete formalization of the deductive system, whether through axiomatization or other formal methods. It requires a formal language (syntax and semantics) and formal rules of deduction. In symbolic logic, the truth-conditions of conclusions and proofs are given by the implications embedded within the total conceptual content of a thought. This totality – whether an atomic or complex statement – is symbolically represented together with its truth-conditions in the form of logical implications (conditionals). The meanings of symbols are logical objects, and symbols have no meaning beyond the truth-values assigned to them (true or false). Symbolic logic thus radically transforms the concept of identity, replacing it with the concept of equivalence between symbols or signs.

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4.
LOGICAL IDENTITY: A HOLISTIC APPROACH

1 Introduction

In Quine's (1980) account of the interdependence between world, language, and thought, a chain of dependency is established that reveals the layered structure of human cognition and communication. According to this view, the ontology of a theory depends on the language in which the theory is formulated; the language of the theory depends on the conceptual scheme of its users; the conceptual scheme of language users depends on the idioms of identity and quantification; these idioms, in turn, depend on the culture in which they are embedded within natural language; and culture itself is shaped by the psychogenetic and ontogenetic development of individuals (Quine, 1976). Each individual thus possesses a conceptual scheme that can be fully actualized only within a culture sharing the same ontology and linguistic framework.

A theory expressed in one language is therefore not fully translatable into another, due to divergences in the idioms of identity and quantification ("indeterminacy of translation"), differences in ontological commitments

("ontological relativity"), and culturally variable tendencies to attribute existence to certain kinds of objects ("inscrutability of reference"). As Peter F. Strawson observes, Quine's inquiry into the possibility of retrieving "objective reference" begins with an analysis of theory and language but ultimately leads to a retreat from mentalism and toward the recognition of underlying "psychological mechanisms" that remain largely implicit (Strawson, 2000, 124).

This simplified scheme outlines the relativistic and pragmatic foundations of knowledge – namely, epistemic holism – constructed from perceptual and rational components that jointly determine the relation between world, thought, and language. If this scheme is reformulated in terms that bring world, thought, and language into more direct relation, the chain of dependence appears somewhat differently: the ontological status of a physical object depends on the ostensive actions of agents and on singular linguistic expressions; singular linguistic expressions depend on the idioms of identification and quantification that permeate language from the underlying conceptual scheme; the scope of singular and existential quantifiers depends on the position or level at which an object is situated within the hierarchy of cultural facts (as Quine puts it, "from atoms to Homeric gods"), that is, on what a given culture classifies as physical or non-physical; and finally, the types of cultural facts depend on whether their roots are predominantly

ontogenetic (as part of perceptual psychology) or psychogenetic (as part of mental ontogenesis).

A careful reading of the preceding paragraph reveals that the only element of the general scheme not explicitly paraphrased in its particular formulation is the expression "idioms of identity". Up to this point, the discussion has largely followed the explanatory framework developed by the American philosopher Willard Van Orman Quine. His version of holism – unlike, for example, that of Donald Davidson, articulated in *Reality Without Reference* (Davidson, 1977, in Davidson, 1984) – is restricted to scientific theory and the conceptual scheme. In Quine's account, the theory within this holistic structure possesses both internal and external boundaries: the external boundary is experience, while the internal boundary is determined by the structure of the conceptual scheme, which constitutes the logical core of the theory.

The objects of experiential evaluation are not individual propositions but the theory as a whole, extending all the way to its logical center. This is because a theory is, in effect, a conceptual hierarchy composed of ontological and linguistic hierarchies, themselves formed from ontological and linguistic particulars and universals of varying degrees of generality. A theory is thus an "equilibrium" of propositions (Quine, 1980, 43) that collectively stand in relation to experience. This equilibrium may be interpreted as an equilibrium of identity,

constituted through different modes of identifying and re-identifying objects. This interpretive possibility is the central suggestion of the present text.

In Quine's account, knowledge is doubly dependent: it is shaped both by ontology and by ideology. The same experience – and the same ontology – may be evaluated differently within the conceptual scheme of another individual (Quine, 1980, 10). A theory depends on the choice of ontology because "one's ontology is fundamental to the conceptual scheme by which one interprets all experience" (Quine, 1980, 10), and it also depends on the referential possibilities of language. For this reason, Quine speaks of the inscrutability of reference, the indeterminacy of translation, and ontological relativity (Quine, 1960).

The holism of identity – the idea we aim to defend here – initially parallels the holism of knowledge and is related to Wittgenstein's notion of a "language game" or "form of life", which encompasses a network of analogously structured mental, physical, linguistic, and social reactions or aspects (Wittgenstein, 1948, in Wittgenstein, 1960). The difference, however, lies in what a developed theory of the holism of identity – of the kind suggested here – would entail. Such a theory would conceive identity as a network of parallel, distributed reactions: reactions of identification, physical reactions, linguistic reactions, reactions triggered by external stimuli, reactions shaped by social influences, reactions

grounded in first-person ontology, reactions shaped by third-person ontology, reactions produced by social ontology more broadly, and reactions arising from established sequences or stereotypes of logical identity.

This interpretation of identity aligns more closely with Quine's later thinking in *Philosophy of Logic*, where he argues that a substitutive interpretation of identity is preferable to an object-dependent interpretation (Quine, 1970, 47 – 60). Quine expresses this view even more explicitly in *From Stimulus to Science* (1995, 91), where he emphasizes the primacy of substitutional over objectual readings of identity.

Building on Quine's well-known slogan "No entity without identity", and on the assumption that an entity, for any given theory, is whatever that theory posits as existent – whether Homeric gods or physical objects – and that the difference between such entities is merely a matter of the degree of belief in their existence, one may formulate a consequential extension of Quine's principle: "As much identity, so much existence", or, equivalently, "What kind of identity, such a kind of entity". This formulation introduces the claim that the issue at stake is not solely one of differentiated ontology or ontological hierarchy, but also of a differentiated concept of identity and a differentiated use of the identity sign.

To clarify the idea we are proposing – and to distinguish it from other approaches in the same domain – it is useful to state the following directly: the holism of

identity refers to the differentiation of interactive degrees of identification and to the hierarchies of representation that intertwine or are distributed in parallel within a functionalist framework, or within a function of unambiguity that binds them into a coherent whole. In other words, if Quine's thesis holds that ontological differences are matters of theory and of the degree of belief a theory assigns to the existence of the entities it employs, then one may also argue that the identity attributed to these entities within the theory – during the process of constructing knowledge about them – depends on whether identity is conceived as a relation grounded in shared essence (substantial identity or unity), as a relation grounded in similarity of qualities independently of essence (qualitative identity or resemblance), or as a relation grounded in the quantity of properties possessed (quantitative identity or equality).

This differentiation, expressed in ontological terms, corresponds to degrees of ontological generality ascribed to entities within a theory (in which, strictly speaking, nothing is singular). At the same time, it depends on the hierarchy and expressive capacity of the logical forms that are instantiated by atomic propositions concerning those entities, as well as on the hierarchy of languages employed to articulate the identifications of identity within the theory.

My aim in this article is to outline several consequences of Quine's thesis concerning the dependence of ontology

on ideology (Quine, 1980), that is, the dependence of entities on identity, or the dependence of ontology on language. If Quine's thesis is correct, then the conclusion may be extended: ontology depends on identity, or more precisely, on the identification procedures and the "identity criteria for conceptual schemes" (Davidson, 2001, 184) constructed within a theory. This implies that we must examine the different types of identity that shape the choice of ontology and upon which the ontology of a theory ultimately depends.

It is useful here to recall Aristotle's early distinction between types of identity (*Metaphysics*, 1021a10 – 15), where he differentiates the identity of things on the basis of the conceptual and linguistic network through which they are named and predicated. Aristotle distinguishes:

(1) essential or generic identity – identity grounded in belonging to the same genus;
(2) specific or qualitative identity – similarity in species or in specific qualities;
(3) numerical identity – equality or strict sameness.

These distinctions correspond to what Aristotle elsewhere formulates as synonymous, homonymous, and paronymous identity (*Categories*, 1a1 – 1a20).

If, therefore, Quine's claim that "there is no entity without identity" (Quine, 1969, 27) is valid, then the complementary claim also appears defensible: "Like

identity, like entity". In other words, the ontological status of an entity within a theory is conditioned by the type of identity attributed to it – whether identity is conceived as substantial unity, qualitative similarity, or quantitative equality. The ontology of a theory thus reflects degrees of ontological generality assigned to entities, degrees that depend simultaneously on the hierarchy and expressive capacity of the logical forms instantiated by atomic propositions about those entities, and on the hierarchy of languages through which identity-attributions are articulated.

Quine describes this dependence as a dependence of ontology on the language of a conceptual scheme, or more specifically, on the idioms of identity and quantification. Yet in his account, this dependence is understood primarily in terms of quantificational idioms – those expressions of variable-quantification that structure and dominate our entire ontology. According to Quine (1980, 12), the quantificational idioms "all", "some", and "none" constitute our sole point of entry into ontological commitment, that is, into the ontological choices a theory makes from its periphery to its center, or, as we would prefer to say, across all levels of identity-identification. These idioms form the basis of Carnap's claim that "to be means to be a member of a system" (Carnap, 1956, 207) – a linguistic system or framework – and they stand at the core of Quine's own formulation: "To be is to be the value of a variable" (Quine, 1980, 15).

However, this mode of determining the existence of objects becomes significantly more complex once logical connectives within the propositional calculus are taken into account. Quantificational idioms indicate only the scope within which a fact is treated as an object – an "object-bound variable" – but they do not determine the kind of existence attributed to that fact. In my view, this latter task can be accomplished only through the idioms of identity-identification: idioms by which two things are judged "identical" because they share an essence (belong to the same genus) and therefore bear the same name; or because they are assigned the same name on the basis of a shared property; or because the name of one thing is derived from the name of another.

It is precisely these idioms of identity-identification that we wish to highlight. The crucial point is that both peripheral and central identity-idioms must harmonize in order to produce an equilibrium of identity across different types of predication. More specifically, the type of identity – or the type of identity-identification – is directly connected to the kind of existence an object possesses prior to its theoretical ascription, modification, or confirmation. This implies a form of realism akin to what John R. Searle (1998, 11) calls the "default" existence of objects.

Such a view also requires a renewed consideration of Aristotle's claim that identity is a relation between things (ὄντα), not merely between words "without reality". This reorientation disrupts the harmonious

relativism characteristic of Quine's triadic relation between world, language, and thought. It suggests instead that the initial ontology must be the one that allows something to be what it is before our theory declares it to be thus-and-so.

2 Use of the Identity Sign

Ludwig Wittgenstein, in his two major works, more decisively than Frege or Russell, initiated a sustained investigation into the relations among world, language, and thought, and in doing so introduced a distinct use of the identity sign. In the Tractatus Logico-Philosophicus (Wittgenstein 1922, in Wittgenstein 1960), he attempts to analyze this relation by presenting it as a structural unification of world and language. This unification is expressed through a special use of the identity sign, functioning as a symbol of equivalence between two sets: the set of the WORLD and the set of LANGUAGE, represented as {W} = {L}. Here, the focus is on the positional classification of facts that constitute the ontology of {W} and the facts that constitute the ontology of {L}.

Their identity is postulated on the basis of a mathematical criterion of equivalence, achieved through a method of mutual mapping between the two domains – a method rooted in the philosophical developments from Georg Cantor through Gottlob Frege to Wittgenstein. Consequently, in the Tractatus, the set {L} is

conceived as an image of the set {W}, insofar as an atomic proposition {p} is the image of an atomic fact {w}.

In the Logische Untersuchungen, Wittgenstein (1948, in Wittgenstein 1960) alters the function of the identity sign, seeking a semantic rather than a merely structural unification of world and language. This unification is expressed in the form {W = L}, which is equivalent to {L = W} and to any other formulation derived from it. In this framework, each set consists of a holistic language-game (l = w) or a form of life (w = l), each containing a network of mental, physical, and linguistic reactions that function as a corresponding or analogous set of facts.

The criterion of identity in this later theory is given through a functional definition – through the use of idioms of identification specific to each language-game. Consequently, it is impossible to know in advance the meaning of words within a language-game, just as it is impossible to determine its ontology in advance. Both depend on the type of stimulation involved, whether physical, mental, verbal, or social. When all elements of a language-game are in place, a meaningful unification of all reactions becomes possible. If words lack meaning – or cannot acquire it given the dominant criteria of identification within a particular game – then there are no objects to which they can be attributed.

However, Quine's slogan "No entity without identity" (1969, 27) cannot be reversed if "entity" is taken to mean

something that exists in space and time. In this case, the conversion does not hold. This is precisely why Quine's notion of an ontological positum is acceptable: something that is a physical object and something that is Hermes (one of the Homeric gods) can equally function as objects of a theory. What differs is only the degree of existence attributed to them within that theory, not any intrinsic property belonging to them independently of the theory.

This means that the identification of their existence – whether external or internal, and regardless of the degrees of physical or mental states involved – is dependent on the conceptual scheme. Their existence within the theory is further dependent on the theory of language that articulates the achieved identification. Attributing meaning to words is therefore directly connected to attributing existence to the objects they identify.

Let us attempt to repeat Quine's well-known *Gedankenexperiment* with the rabbit and the identification of the identity of "rabbit stages" (Quine, 1960, 26 – 31), now considered under a second "type of attribution". A description of the rabbit's movement in space, expressed in the vocabulary of natural language, differs fundamentally from an algorithmic description of the rabbit's movement expressed in the vocabulary of mathematical language. What matters is that, within the conceptual scheme operating in natural language, an object such as a "rabbit" (Lepus) is identified as "a rodent belonging to the family of mammals, characterized by a cleft

upper lip, long hind legs, a short tail, and long ears", or, in a child's epistemology, as a "sweet – with – large – ears – fast – hairy – warm – animal" that is "not called a squirrel" but is named by the word "rabbit".

In a mathematical description of a natural state of affairs – such as the rabbit's movement – object identification is not performed through definition, but through the description of one of its spatio-temporal properties, without specifying what the object is or what distinguishes the movement of a rabbit from that of any other creature. The question is simply how an object behaves in space and time, given the characteristic one wishes to track across temporal sequences. What "rabbit paw" means within a culture that frames the description is irrelevant, just as it is irrelevant what kind of animal a rabbit is, whether it belongs to the same kind as a squirrel, or what specific differences separate them. Even less relevant is the fact that the Latin name for the wolf is Lupus.

At this point, we may return to the question posed by Gottlob Frege (1918, in Patzig 2008) in *Über Sinn und Bedeutung*: whether identity is a relation ascribed by a theory employing an unambiguous symbolic language, or whether it is a relation that exists independently. Frege formulates this as the question of whether identity is a relation between signs designating objects, or a relation between the objects themselves. The graphic contrast between "a = a" and "a = b" was sufficient for

Frege to suggest that, without endangering truth (the truth-value of statements), the same thought content may be represented in different ways within the same artificial (symbolic) language.

But if we move away from Frege and closer to Quine, a different question arises: does the "a" in the expression "a = a" possess more, less, or the same ontological status as the "b" in the expression "a = b"?

This brings us close to the line of inquiry pursued by Strawson (1990, 17), who asked which is ontologically primary, "a" or "b", concluding that "a" is primary if it contains "b" within it. Strawson's question is analytic, concerning the hierarchy of languages and the complexity of symbols – a line of thought he inherits from Carnap. My question, however, concerns differentiated ontology and differentiated identity-identification. Can a single theory contain entities with different ontological statuses at different levels of theoretical structure, and does this imply a hierarchy of the existence of objects or a hierarchy of the identification of their existence? Furthermore, what does this mean for the theory itself, for its idioms of quantification and identification?

At this point, it is useful to recall Wittgenstein's intellectual effort and ask whether, through the type of identity (or the type of attribution of meaning, and thus of existence), we are adjusting the structural or the semantic unification of ontology and language.

It is necessary to reconsider what follows from such a relation for the ontological and epistemological assumptions of a theory. Quine treats the entities of scientific theory as cultural facts that differ only in the degree of belief in their existence, not in the type of their identity or existence. Physical objects and Homeric gods are both positums (Quine, 1980, 44), entering theory on the basis of belief or on the basis of the existence attributed to them within a cultural framework. If this is so, then we are entitled to correlate the degree of existence with the degree of identification, and to say: "What the entity is, such is its identity", or: "As much identity as there is, so much entity there is".

To express the same idea differently: if the objects of thought differ in the degree of belief in their existence – if they differ in the degree of their positioning within a system of beliefs – then the mental coherence of our knowledge of these objects likewise differs according to the degree of identity-identification or the type of identity that is epistemologically constituted.

Quine's distinction between the ontology and the ideology of a scientific theory (Quine, 1980, 131) forms an integral part of his thesis that the world is dependent on the conceptual scheme of the language that articulates it. Ontology is thus dependent on culture, insofar as ontological facts are cultural facts. Whatever a culture takes to exist – regardless of the degree or mode of its existence, and regardless of how strongly this depends on

sensory stimulation – functions within a theory ("a theory grounded in a particular culture") as an object about which the theory is constructed. Such a theory is composed of a logical center and an experiential periphery.

Ancient culture, for example, included in its ontology the immortal Olympian gods (ἀθάνατοι θεοί) and various mythical beings, treating them as existing entities – as what is – alongside humans, animals, plants, and celestial bodies.

What stands in contrast to these culturally embedded ontologies is the scientific paradigm, or the rationally acceptable ideology of science at a given historical moment. Physics, as a science of nature, posits self-constituting matter, atoms and electrons, forces and fields, motion and rest. Within such a paradigm, it is incoherent to speak of immaterial beings as space-time phenomena in the language used to describe physical things. This scientific paradigm – whether accepted or rejected by admirers of ancient culture – underlies a conviction often labeled "atheistic", present across monotheistic cultures as well. It is supported by the most rational evidence available within the language of things, and its idioms of identity-identification provide the highest degree of uniformity.

Different cultures with different ontologies may or may not accept the same physics – the physics reached by educated individuals at a given time. Within any culture, however, it is typically clear what counts as a

physical object and what its physical properties are, as well as what language explicates this ontology. Likewise, it is clear what mental objects are, what their properties are, and what language explicates that ontology. The same holds for objects of belief and the language of the theory that explicates them. Yet no single theory – understood as a set composed of "periphery / experience plus center / logic" – can be unambiguously applied to all cultural facts, even though all ontological states may be declared cultural facts.

In cultures strongly shaped by monotheistic belief, statements involving a supernatural ontology cannot be verified individually or collectively by appeal to the experiential periphery shared with physical objects possessing atomic structure and gravitational force. Instead, they are verified relative to the experiential beliefs of the entire believing community, within the holism of the mental. Mental states of belief and hope appear in representational forms such as "I believe that ___" or "I hope that ___", and these forms identify such mental states as real or as existing elements of an ontology of belief, rather than as phenomena belonging to the ontology of things.

The question raised by Saul Kripke (1972) concerning whether words are rigid designators in all "possible worlds" may be reformulated here: does the identification of identity and contradiction – hence the identification of truth and falsity – operate according to the

same rigid logical principles in all "possible conceptual schemes", whether phenomenological or non-phenomenological? Or do different ontologies require different principles?

What we wish to suggest is this: primary or local ontologies of different theories do not differ merely because the cultures that produce them differ, but because the identification framework of each theory – and thus the ontological status of its objects – is complex, regardless of the culture that produces it. The ideological or identificatory status ascribed to objects within a theory depends on the dominant type of identity that the theory constructs at one of its levels. For example, the hypothetical level of a theory is not equivalent to its analytical, synthetic, or inferential level.

Idioms of identity-identification depend on culture and language, but their function is universal: they serve to discriminate sensory and perceptual objects, large and small forms, momentary and recurrent configurations, short-term and long-term processes, mental classifications of objects, formalized class-class distinctions, and so forth. They permeate all hierarchies of perceptual and mental identification, beginning at lower levels and culminating in higher cognitive levels (Kosslyn, 1995).

3 The Identification Domain of a Theory

The identification domain of a theory determines the identificatory status of its objects by situating them at a particular theoretical level – hypothetical, analytical, synthetic, or otherwise. Each level provides its own criteria of identity, which form the basis for treating identity as superior or conditional, categorical or unconditional, analytical or deductive, synthetic or multicontextual, and so forth. The identificatory status an object receives is thus shaped by a theoretical criterion of identity that ensures uniformity of function at that level, integrating all components of conceptual content that are semantically and structurally aligned with the truth-conditions imposed by that criterion.

Within any culture, there are entities to which existence is attributed in different modes: as spatio-temporal (physical), conceptual (logical), mental (psychological), or linguistic (verbal). The nature of existence, or the ontological level attributed to objects, determines the kind of theory constructed in the language appropriate to that context. What follows from this is that the relationship between entity and identity within a theory should not be viewed through the simplified scheme "one culture – one ontology" (or "one entity – one identity"). Instead, we must speak of a complex ontological context to which an object belongs to a greater or lesser degree, and within which it functions more or less objectively.

The ontology of a theory cannot conflict with the logical center of that theory – that is, with the logical instruments that ground and justify it. A single culture produces multiple ontologies and different vocabularies that belong to them contextually. Yet different levels of identity can be formulated or achieved within a given ontology and its vocabulary. Identity is a holistic achievement: something a theory must secure by aligning semantic and structural sequences, which – if the theory is scientific – take the form of logical stereotypes composed of *if – then* structures. The criterion of identity corresponds to what Davidson calls the "criterion of translation" for conceptual schemes (2001, 184), and may be understood as the criterion for aligning structural and semantic levels of identification.

Let us recall: Quine made the ontology of a theory dependent on the ideology of that theory. His slogan "No entity without identity" may be interpreted as: "There is no ontology (of a theory) without the ideology (of that theory)". This expresses the idea that ontology depends on the language of the theory in which it appears. One might therefore reformulate the slogan as: "There is no ontology without ideology". As a counterbalance, we introduced the complementary slogan: "Like ideology, like ontology," or equivalently, "Like identity, like entity".

Let us now attempt a *Gedankenexperiment* that may clarify this claim. Suppose we accept the ontological context of Book Κάππα of Homer's *Odysse*y as part of a

distinct theory arising within a particular culture, and distinguish it from the ontological context of Book Λάμβδα. Within Book Κάππα, we may treat as cultural facts or ontological positums the figure of "beautiful-haired Circe": Κιρκή εὐπλοκαμόσ (*Odyssey*, K. 136) or Κιρκή καλλιπλόκαμοσ (K. 220), or "herb-skilled Circe", who works with plants and prepares dangerous potions that make men forget their homes. We may also accept that she can transform sailors into pigs with a stroke of her wand.

However, within this conceptual scheme, we cannot assign to Circe the same ontological status as, for example, "the beautiful-haired graduate pharmacist employed at the 'Old Town' pharmacy in Sarajevo", or "plavolasa diplomarana farmacevtkinja, ki dela v 'Lekarni' na Miklošičevićevi ulici v Ljubljani" (regardless of the different languages in which these two ontology, as opposed to those of Homer, appear). Although these individuals also work with herbs, none can perform miracles with a magical wand or prepare potions that erase memory. Likewise, we cannot identify the meaning of Κιρκή φάρμακου (*Odyssey*, K. 276) with the meaning of "pharmacist Zlata" or "pharmacist Mojca. "

We may introduce ontological gradations within Book Kappa and say that the existence of pigs has a higher degree of ontological existenc than that of the sorceress Circe. But we cannot grade the entire ontological context of Book Κάππα relative to that of Book Λάμβδα,

where Odysseus descends into the Underworld and encounters the souls of the dead, who await the blood of sacrificed animals in order to speak truthfully, including the soul of the prophet Tiresias of Thebes (*Odyssey*, L. 100–135).

Both Book Κάππα and Book Λάμβδα belong to the overarching context of the *Odyssey*, which contains twenty-four parallel ontological contexts, each with its own ontology and with varying degrees of identity-identification (in my terminology) or ideology (in Quine's terminology).

4 Logical Identity and Its Semantic Differences

The type of identity-identification employed in a theory reveals the kind of existence attributed to its entities. Identity is, first and foremost, a mode of identification: a way in which parts of a thought-content are equated according to their semantic function within the formation of a statement. This function aims at unambiguity, which carries a truth-value because it is governed by a logical law – or, in Donald Davidson's terms, by a "criterion of identity for conceptual schemes". At the same time, identity is a form of representation of this unambiguity, a function that possesses not only semantic but also structural competence, or what Tarski (1956, 189) calls "satisfaction". A simple thought-content may be represented by a complex symbol (e. g., double negation), while a complex content may be represented by a simple symbol.

Let us now return to Aristotle's differentiated concept of identity presented in *Metaphysics* (M. 1021a10). If we wish to identify things (ὄντα, ὧν) as identical, this can be done in three ways:

(1) things are identical (τό αὐτόν) because they are homogeneous, that is, because they share the same essence (ὧν μία ἡ οὐσία) or fall under the same genus (the genus being the essence of the things).
(2) things are identical (τό αὐτόν) because they are similar (τό ὁμοῖον), that is, because they share the same quality of essence (ὧν ἡ ποιότησ μία).
(3) things are identical (τό αὐτόν) because they are equal (τό ἴσον), that is, because they share an equal quantity (ὧν τό ποσόν ἓν).

Let us now connect these three modes of identity-identification with their linguistic-grammatical and logical realizations through the three kinds of predication – synonymy, homonymy, and paronymy – discussed by Aristotle in the *Categories* (1a1 – 1a15).

In case (1), if things share one essence, then they have
(a) a common name (ὄνομα κοινόν), and
(b) an identical concept of essence (definition) signified by that name (ὁ δέ κατά τούνομα ὁ λόγοσ τήσ οὐσίασ ὁ αὐτόσ).

In Aristotle's terminology, these are co-named (synonymous, συνώνυμα) things (ὄντα), and their identity is synonymous identity, which grounds synonymous

predication and necessarily links subject and predicate. In this context, things should be named by a common (not numerically identical) name because the genus is one. Thus, we may call both "man" (ἀνθρόποσ) and "ox" (βοῦσ) by the name "animal" (ζώον), because they fall under the same genus, which is the essence attributed to them by definition.

If we wish to state in what respect man and ox are identical, we may say that both are "animals". This is a remote or generic logical notion of identity. If we wish to justify this definition and explain why the common name "animal" (ζώον) appears in the definitions of man and ox, we would enumerate the properties of animals that belong equally to both. This notion of identity corresponds to logical or analytical identity.

In case (2), when things share a single quality, they possess

(a) only a common name (ὀνομα μόνον κοινόν), and
(b) different concepts (definitions) associated with that name (ὁ δέ κατά τούνομα ὁ λόγοσ τήσ οὐσίασ ἑτεροσ).

As Aristotle explains in the *Categories*, this concerns same-named (homonymous, ὁμώνυμα) things (ὄντα) or homonymous identity – identity based on similarity (τό ὁμοῖον). This is the basis of homonymous predication, an accidental connection between subject and predicate. Homonymous predication is synthetic and ambiguous

because it does not follow from a shared definition but from the accidental co-presence of two or more predicates in one subject.

Thus, things may share a common name without sharing the same definition, genus, or essence; they share only a quality. A "man" walking on the street and an "image of a man" painted on a Greek vase may both be called "animal" (ζώον), but the definition of "man" differs from the definition of "painted man". This is a case of qualitative rather than essential identity.

In case (3), when things have an analogical name, one thing is named by analogy to another. The name of one thing is derived from the name of another: for example, "grammarian" is derived from "grammar." In Aristotle's terms, these are paronymous things (παρώνυμα), named according to a shared quality. Their identity is paronymous identity, grounded in analogy, and expressed through paronymous predication.

Let us now return to Frege's discussion in *Über Sinn und Bedeutung*. The difference between "a = a" and "a = b" is not merely a difference in representation, nor does it simply indicate that "b" is an equivocation, a homonym, or another linguistic form of "a", as "5" is another linguistic form of "2 + 3". Rather, the difference may indicate a difference in the ontological status of the entities brought into the identity relation, or a difference in the type of identity-identification attributed to the same entity.

This shows that a named entity cannot always be denoted by a single set of signs, nor can it always be captured by a single criterion of a conceptual scheme or a single criterion of translation. A conceptual content may be identical to itself (substantial identity), yet one of its properties – one that characterizes it in its definition and can be transformed into a definition – may be denoted by a series of signs functioning within a unified system of unambiguity.

This possibility of cognitive conversion or cognitive synonymy is precisely what Frege established through his *Begriffsschrift*.

Here, the issue is not whether an object or entity exists or does not exist, but rather how it can exist for us as identical across all its phases – physical, mental, and linguistic – within the complex we construct. If "b" is a common name for "a", or if "a" and "b" are two different signs for the same entity, then the distinction lies in which entities are being identified as identical. If the relations "a = a" and "b = b" are both contained within the relation "a = b", nothing in the written signs themselves licenses a transition to "a = b" unless there is a third element that connects both signs as its names and thereby confers identity upon them.

In Aristotle's syllogistic, the truth of "a = b" cannot be demonstrated unless there is a common name or sign "c" such that "a = c" and "b = c". Conversely, it cannot be demonstrated if "a = b" and "b = c" hold without a

mediating structure that justifies the inference. This is why Aristotle distinguishes between definition (ὁρίσμοσ) : a = b, b = c, c = d and demonstration (ἀποδείξισ): a = b, b = c, therefore a = c.

Frege interprets this relation as an equivalence of modes of presentation: "a" and "b" are different linguistic ways of presenting the same conceptual content. For Frege, the expressions "Venus = Venus", "Venus = der Morgenstern", "Venus = der Abendstern", and "der Morgenstern = der Abendstern" all express the same identity, though through different senses. Words and sentences are connected not only with objects but also with concepts, with the sense of words and not merely their reference. Thought, for Frege, is the sense of a proposition, the structure of thought (*Gedankengefüge*) (Frege, in Patzig, 1966, 72).

In the case of "a = a", we are dealing with an analytic proposition, expressing the logical identity or equality of an entity with itself (substantial identity), valid regardless of the type of entity – imagined or real, fully existent or marginally existent, entity or quasi-entity. It would remain valid even if all reality were reduced to the single sign "a".

Let us now consider the case "a = b". Traditionally, this is a synthetic proposition. To connect Aristotle's and Frege's interpretations, we can treat this as a conceptual *Gedankenexperiment* and ask: what combinations or syntheses are possible, and what might "a = b"

mean under different ontological or epistemic assumptions? Let us include even those cases that are fictive or imaginable without empirical confirmation.

a) *Substantial Identity (Identity of Things)*

Possible interpretations include:

1. a relation between two entities: entity "a" and entity "b".
2. a relation between two signs/names referring to the same entity.
3. a relation between the existence of one entity across different temporal sequences.
4. a relation between spatial phases or sequences of one entity.
5. a relation between different types or levels of identification of one entity in a process.
6. a relation between different levels of identification of two entities.
7. a relation between different parts of one logical content: subject "a" and predicate "b".

b) *Qualitative Identity (Similarity of Things)*

8. a relation between degrees of identification of the same property of one entity – different levels of logical generality attributed to one property and different representational complexities.
9. a relation between degrees of logical generality under which entities fall.

10. a relation between two ontological degrees of generality that an entity possesses within a theory.
11. a relation between two linguistic degrees of generality applied to an entity.

c) *Quantitative Identity (Equality of Quantity)*

12. a relation between different quantities of the same property possessed by one entity (quantity "a" of property D of entity P vs. quantity "b" of property D of entity P).
13. a relation between different marks or symbolic designations of the same property for one entity (mark "a" of property A for entity P vs. mark "b" of property B for entity P).

At this point, we allow ourselves a degree of imaginative freedom in order to illustrate the many conceptual rotations underlying the idea of identity holism. At every level, or within any isolated type of identity-identification, it becomes evident that all other types are present in some form. In each of the possibilities listed from (1) to (13), ontological, logical, and semantic modes of identity-identification are intertwined in parallel. These identity differentials reveal the complexity and interdependence of the various forms of identity-identification. This means that identity is neither a rigid analytical identity of an object with itself, nor a rigid or necessary attachment of a predicate to a subject whose content is already contained in the notion of the subject.

There is even a difference in the notion of necessity or rigidity itself – one that Saul Kripke highlights when introducing the idea of something being "a priori but based on experience" (Kripke, 1972). In other words, the path toward rigid conclusions within a theory is gradual and difficult; it requires the establishment of a network of identity-identifications across language and metalanguage, across initial consequences and later derivations. Moreover, identity – like contradiction – must be re-identified each time it is applied (Ibrulj, 1999, 212). For this reason, scientific theory, like everyday discourse, remains perpetually open to revision, reconstruction, and reinterpretation.

Idioms of identification function as truth-operators: open statements whose ontological capacity depends not only on the variables to which they are bound, or on the idioms of quantification operating within a language, but also on the system or construction of identity established at a given theoretical level. This system integrates and distributes subjects and predicates by arranging logical matrices that determine how identity is recognized, stabilized, and applied.

5 Conclusion

The strategy of this text has been guided by the idea that not only does the ideology of a theory determine its ontology, but that the types of identity a theory employs – its algorithmic blocks or stages of identifying parts of

conceptual content – also determine the ontological status of the theory's objects. These types of identity function as elements of a unifying mechanism that reaches toward objects of experience and thereby shape the type of entity, the theoretical context, the language of the theory, and ultimately the truth-value of the theory as a whole.

It was tempting to explore the possibility of connecting Aristotle's complex notion of identity – his triangulation of logical, ontological, and linguistic identity – with the idea of identity holism. Aristotle's framework distributes and integrates subjects and predicates across different levels through criteria of identification expressed in synonymous, homonymous, and paronymous identity. Yet this Aristotelian differentiation in the use of the identity sign, or in the ways "the same is said" (τό αὐτό λέγεται), should be used here only in a limited and illustrative sense: as a demonstration of the many possible ways identity can be conceived when reflecting on the structure of language, world, and thought, and on how these structures align semantically and structurally.

Identity is a complex relation that emerges simultaneously on semantic and structural levels. It concerns logical, ontological, and linguistic particulars and universals from which lay, religious, mythological, or scientific theories are formulated – each dealing with objects that may be called cultural facts, as Quine suggests, but which in every culture possess an established stereotype of existence attributed to them. This stereotype

depends on the type of identity-identification arranged within the theory chosen to accommodate the objects that appear in it. A theoretical paradigm or stereotype of identification does not arise from the discovery of an object, whatever its properties may be; rather, it strongly influences whether the object will appear within the theory as physical, rational, irrational, or fantastic.

In contexts where multiple objects governed by different identification criteria appear, it becomes possible to establish ontological discrimination by determining the ontological status of each object relative to the cultural context from which it is positioned, relative to the global conceptual scheme or "world-picture" (Davidson) shared by participants in a culture, within which a linguistic division of labor operates (Putnam), and relative to the kinds of ontological status objects possess in themselves.

The idea of the holism of identity supports an understanding of theory as a set of identity criteria, each operating vertically – through synonymous identity and logical relations of belonging, inclusion, and predication, corresponding to different levels of logical generality – and horizontally, through reduplication of names culminating in deviant or paronymous identity, as well as through the use of identical names in homonymous identity. Identity holism thus reveals the multidimensional structure through which theories integrate, differentiate, and stabilize the objects they describe.

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