*Aristotelian (Traditional or Categorical) Logic*

**Where did this idea start? Where does It come from?**

When we think of logic, we think about Aristotle. In Aristotle the term used to cover the domain of logic was ‘analytics’, because logic referred to the analysis of reasoning through a particular form of correct argument, which is the **syllogism**.

*Prior analytics*: work on syllogistic reasoning.  *Posterior analytics*: deals with the so-called logical demonstration (how syllogism/ logic applies to scientific reasoning).

**What is a syllogism?**

All men are mortal (**minor premise**)

Socrates is a man (**major premise**) Socrates is mortal (**conclusion**)

* “Man” is called **medium term** (M), appears both in the first and second line.
* “Mortal” is major extreme (P). It is the predicate of my conclusion (grammatically speaking). It can be the predicate of Socrates.
* “Socrates” is minor extreme (S). It is the subject of the conclusion.

The first two are the premises, the third is the conclusion. The premises and conclusion are sentences with a particular grammatical form. (subject + copula) = basic units of the syllogism. These sentences are known as **propositions** (where we propose something about something else, put forward this) [Also known as statements or assertments because they STATE/ ASSERT something about something else].

The structure of syllogism is: Subject + Copular + Predicate

* The major term is also the predicate of my conclusion
* the minor term is the subject of the conclusion. I derive this conclusion by inference from the two premises.

(P1)MP (P2)SM (C)SP (mortal-men, Socrates-men, Socrates-mortal)

When we say “all men are human” we are saying something (being human) about something else (men).

*Categorical Logic*

Men and Human are known as categories (or classes) that is why this type of logic is called **categorical logic**, which is about sentences that predicate certain things (properties) about categories of objects, or about objects that belong to those classes.

Saying something about something else is logically speaking a shortcut to say “it is true/false that x is y”.

*Binary Logic*   
Also known as **binary logic**, the propositions admit only two possibilities, either be true or false (we look at the form, not at the context).  *Types of propositions*

Aristotle explain that the propositions can be either  - **universal** (generalized to everybody) [“All S are P”] - **particular** (applied to a specific or some specific individual/s) [“Some S are P”]

Each of them can be either **affirmative** or **negative**. There is a limit to the number of ways that you can say that "something is the case”. We need to give ourselves some kind of principles.

*Inferences*

**That process of reasoning that correlates one type of sentence (P) with another (C) on the basis of a series of rules (rules of deduction or rules of logical derivation)**.

Together with these rules, there are also principles:

*Rules of logical derivation*

* In a syllogism there can be only three terms (major, medium, minor)
* The medium term can never be present in the conclusion
* From two affirmative premises we can only derive an affirmative conclusion
* From two particular premises we can never derive a general conclusion.

*General Principles of logical derivation* -  **Identity**: given A=A≠Non-A. the meaning of the category we are referring to can not be changed

* **Non-contradiction**: it is not possible that “A is x” and “A is not x” at the same time, we cannot admit that both are true at the same time;
* **Excluded Middle**: a sentence is either true or false.

*Validity and Truth*

Rules and principles are very important because it is only by following them that we are guaranteed that we are reasoning correctly, that we are making a valid inference.

Any transgression would cause the inference to become invalid or a fallacy.

**Validity is about the form**, a valid reasoning guarantees that a certain correlation is correct by virtue of its inferential form, independently of wether the sentences are true or false.

Though Correct Correlation, even if confirms an argument as valid, does not define that particular argument as true.

There are 256 possible types of syllogism according to Aristotle. Not all will amount to a correct or valid type of reasoning.

**From 256** we come down to **24**, **the rest are fallacies**.

**It can only deal with grammatical relations**, which are not the most interesting, crucial.

*Grey area of syllogistic logic,*

There is a big grey area totally left aside by this type of logic, which is concerned with **relations**. Syllogism only deal with properties, that is with the conjunction or separation between two terms/categories.

What are excluded are the relations we make everyday among people or categories (all verbs that express some type of relations).

*Relations are left out*

"Oedipus loves Jocasta” —> “Oedipus is Jocasta’s lover”

We cannot include them, we do not have the general relation that can be applied in a different content. Relations are unsolvable because of the structure and grammatical relations only allow some types. A term can be allowed only in particular places

*Grammatical Relations are limited*

Pair subject/predicate and their properties

* a universal can be both subject and predicate (a man; is a man)
* A particular can only be a subject, it never can be predicated of anything (we cannot say of someone “he is Socrates”)

“The Greek won against the Persian” —> ?

We could invent a property like “defeating the Persian”. There is not such universal thing related to (love) that is a proposition.

Relations are unsolvable in syllogistic logic, because it is based on subject and predicate and their properties.

“The Greek defeated the Persian” —>“The Persian were defeated by the Greek”.

Logically we need to be able to compute the direction of the syllogism. It seems that grammar is not a good model for logic, it misses part of the picture.

**RECAP: Aristotelian/ Traditional Logic**

* **Categorical**: its sentences are about categories of classes that we predicate with properties
* **Binary**: Either true or false
* **Didactic**: it follows the logic of deduction/ derivation
* **It has a fixed model, the syllogism**: from 2 premises (Maj. and Min.) I derive one conclusion
* **It follows some rules and principles**
* **With Limitations**: even if it follows grammatical relations (often the most crucial types of relations),it stills rejects logical relations.