A History of Logic

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Aristotle 亚里士多德 (384 ~ 322 B.C.)

The rise of modern formal logic following the work of Frege and Russell brought with it a recognition of the many serious limitations of Aristotle's logic.

However, Aristotle shares with modern logicians a fundamental interest in metatheory:

- His primary goal is not to offer a practical guide to argumentation but to study the properties of inferential systems themselves.

Deduction

All Aristotle's logic revolves around **deduction** (　　　).

A deduction is **speech** ($\{λόγος\}$) in which, certain things having been supposed, something different from those supposed results of necessity because of their being so. (Prior Analytics I.2, 24b19-20)
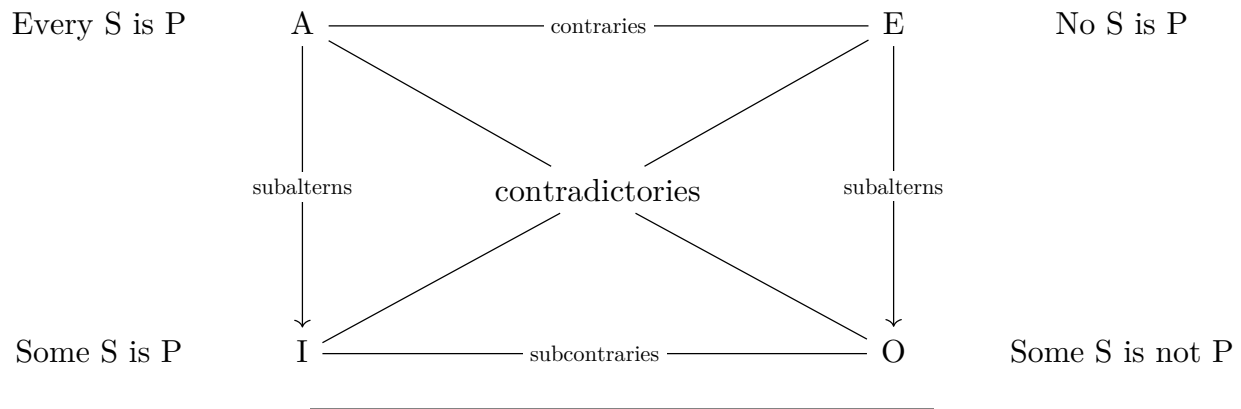
The Organon

Aristotle's logical works, called the Orgranon are the earliest formal study of logic that have come down to modern times:

- The Categories 范畴篇, a study of the ten kinds of primitive terms.
- On Interpretation 解释篇, an analysis of simple categorical propositions into simple terms, negation, and signs of quantity.
- The Prior Analytics 前分析篇, a formal analysis of what makes a syllogism.
- The Posterior Analytics 后分析篇, a study of scientific demonstration, containing Aristotle's mature views on logic.
- The Topics 论辩篇, a discussion of dialectics.
- On Sphistical Refutations 辩谬篇

The Square of Opposition

The square of opposition is a group of theses embodied in a diagram. The theses concern logical relations among four logical forms:

Name	Form	Title
A	Every S is P	Universal Affirmative
E	No S is P	Universal Negative
I	Some S is P	Particular Affirmative
O	Some S is not P	Particular Negative

Every S is P   A ——————— contraries ——————— E   No S is P

subalterns   contradictories   subalterns

Some S is P   I ——————— subcontraries ——————— O   Some S is not P

Chrysippus (279 ~ 206 B.C.)

Aristotelian logic was what was transmitted to the Arabic and the Latin medieval traditions, while the works of Chrysippus have not survived.

Connective Logic

- ∩, ∧, →