

# Logic in the 17th century

Jaap Maat

Core Logic 13 October 2004

## **In this lecture:**

- **characterization of logic from modern viewpoint**
- **how logic was viewed in the period**
- **attacks on logic**
- **defence of logic**
- **philosophical languages**
- **eclecticism**
- **Locke vs. Leibniz**

# Blundeville (1599)

## The four perfect moods in the 1st figure

following: the termes wherof bee these, sensible bodie, substance, and man placed in this sort.

- Bar. Every sensible bodie is a substance,
- ba. But every man is a sensible body,
- ba. Ergo every man is a substance.

The name of this moode is called Barbara, named into three syllables. placed in the margin right against the Syllogisme, to shew the quantitie and qualitie of every proposition, according to the significations of the howels contained in every syllable: and so are all the other names of the Moodes hereafter following. The second Moode is, when three termes being given, a syllogisme is made of an universall negative Major, and of an universall affirmative Minor, directly concluding an universall negative: As for example, let the termes be these: sensible body, a stone, a horse, and the syllogisme thus.

- Ca. No sensible body is a stone,
- ca. But every man is a sensible body,
- ca. Ergo no man is a stone.

The name of this moode is Celarent.

The third Moode is, when three termes being given, a syllogisme is made of an universall affirmative Major, and of a particular Affirmative Minor, directly concluding a particular Affirmative: As for example let these be the termes: sensible body, substance, and man, and the syllogisme thus:

- Da. Every sensible body is a substance,
- da. But some man is a sensible body,
- da. Ergo some man is a substance.

The name of this Moode is Darii.

The fourth Moode is, when three termes being given, a syllogisme is made of an universall Negative Major, and a particular affirmative Minor, directly concluding a particular Negative: As for example, let these be the termes, sensible body, man, and stone: and the syllogisme thus.

- Fe. No sensible bodie is a stone,
- fe. But some man is a sensible bodie,
- fe. Ergo some man is a stone.

The name of this Moode is Ferio.

A disputation at Cambridge, early 17th-century

Thesis:

'threat of punishment is a sufficient deterrent of crime'

opponent:

Where knowledge of a thing suffices,

experience of the thing ought more than suffice

But even the experience of punishment is not sufficient deterrent

Therefore, much less the threat of punishment

The defender denies the major premise

(he denies that where threat is sufficient,

experience ought to be more sufficient)

The end of contemplation is action, therefore experience exceeds knowledge (or threat).

Defender admits the axiom, but maintains that it holds only in matters which are laudable per se

Opponent: punishment per se is laudable.

Defender: not per se

Opponent: Whatever is conducive to virtue is per se praiseworthy

But punishment conduces to virtue

Therefore, it is per se praiseworthy

**Defender: punishment deters from crime but does not conduce to virtue.**

**Opponent: (I'll kill you with your own sword!):  
punishment deters from crime  
therefore it conduces to virtue**

**Defender: I deny this**

**Opponent: (Probabo ex ipso Philosopho!). The  
destruction of one contrary rears up its opposite.  
Therefore what deters from crime conduces to virtue**

**Defender: Good and evil are not immediately  
contrary. Some things are morally indifferent.**

**Disputation for the entertainment of the king  
Cambridge, 1614**

**Question: whether dogs can make syllogisms**

**opponent:**

**the hound obviously reasons as follows:**

**“the hare is gone either this or that way**

**[smells out the minor with its nose]**

**she is not gon that way**

**[and follows the conclusion]**

**ergo this way with open mouth”**

**“As it [i.e. logic] is now used in the Schools it is merely *bellum intestinum Logicum*, a civil war of words, a verbal contest, a combat of cunning craftiness, violence and altercation, wherein all verbal force, by impudence, insolence, opposition, contradiction, derision, diversion, trifling, jeering, humming, hissing, brawling quarreling, scolding, scandalizing and the like, are equally allowed of, and accounted just ... if they can intangle or catch one another in the spider webs of sophistical or fallacious argumentations, then their rejoicing and clamour is as great as if they had obtained some signal victory”**

**(John Webster, Examination of Academies, 1654)**





**John Locke**  
**Some Thoughts concerning Education,**  
**1693**

**“be sure not to let your son be bred up in the art and formality of disputing, either practising it himself, or admiring it in others; unless, instead of an able man, you desire to have him an insignificant wrangler, opiniator in discourse, and priding himself in contradicting others, or, which is worse, questioning every thing, and thinking there is no such thing as truth to be sought, but only victory in disputing”**

**“[disputation] brings a question to a point, and discovers the very centre and knot of the difficulty. This warms and activates the spirit in the search of truth (...) Besides it puts them upon a continual stretch of their wits to defend their cause, it makes them quick in replies, inventive upon their subject”**

***Obadiah Walker, Of Education, 1673***

**“disputing is a very good instrument to sharpen men’s wits, and to make them versatile and wary defenders of the principles which they already know (...) [but] it can never much augment the solid substance of science itself”**

***Thomas Sprat, History of the Royal Society, 1667***



Francis Bacon  
Novum Organum, 1620

“As the sciences which we now have do not help us in finding out new works, so neither does the logic which we now have help us in finding out new sciences.

The logic now in use serves rather to fix and give stability to the errors which have their foundation in commonly received notions than to help the search after truth. So it does more harm than good.”

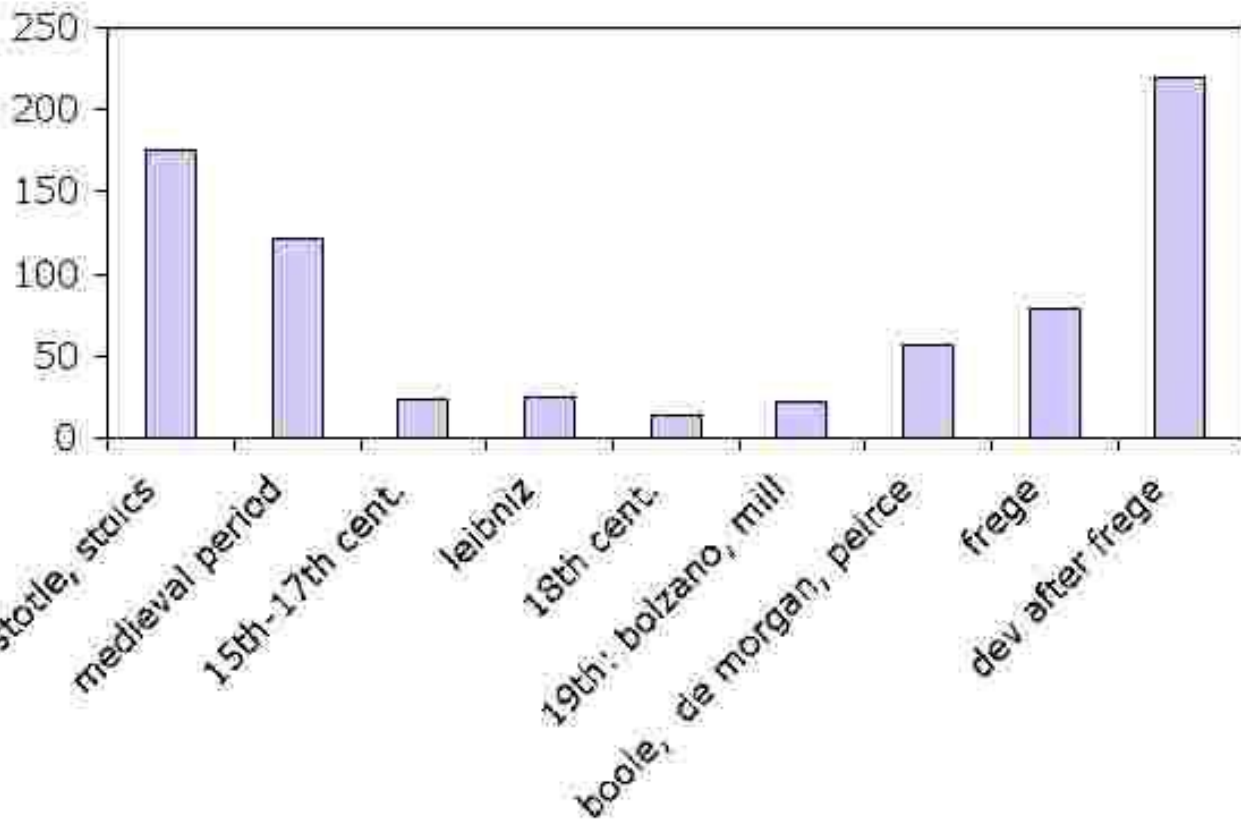


**“The syllogism consists of propositions,  
propositions consist of words, words are symbols  
of notions.**

**Therefore if the notions themselves (which is the  
root of the matter) are confused and over-hastily  
abstracted from the facts, there can be no  
firmness in the superstructure.**

**Our only hope therefore lies in a true induction.”**

### Kneale & Kneale, the development of logic





**René Descartes**  
**Rules for the Direction of the Mind**  
**1628-1629**

**“Some will perhaps be surprised that in this context, where we are searching for ways of making ourselves more skilful at deducing some truths on the basis of others, we make no mention of any of the precepts with which dialecticians suppose they govern human reason. They prescribe certain forms of reasoning in which the conclusions follow with such irresistible necessity that if our reason relies on them, even though it takes, as it were, a rest from considering a particular inference clearly and attentively, it can nevertheless draw a conclusion which is certain simply in virtue of the form.”**



**Our principal concern here is thus to guard against our reason's taking a holiday while we are investigating the truth about some issue; so we reject the forms of reasoning just described as being inimical to our project. Instead we search carefully for everything which may help our mind to stay alert.**



**But to make it even clearer that the aforementioned art of reasoning contributes nothing whatever to knowledge of the truth, we should realize that, on the basis of their method, dialecticians are unable to formulate a syllogism with a true conclusion unless they are already in possession of the matter of the conclusion, i.e. unless they have previous knowledge of the very truth deduced in the syllogism.**

**It is obvious therefore that they themselves can learn nothing new from such forms of reasoning, and hence that ordinary dialectic is of no use whatever to those who wish to investigate the truth of things.**





*Pierre Gassendi, Exercitationes  
paradoxicæ adversus Aristoteleos,  
1624*

*Sextus Empiricus, 2nd cent. A.D.,  
Against the Logicians*

The main defect of *Logick* is, that it teacheth no certain rules, by which either notions may be truly abstracted and gathered from things, nor that due and fit words may be appropriated to notions, without which it fails in the very fundamentals, and falls as an house built upon sand.

*John Webster, The Examination of Academies, 1654*

from false premisses:

*Nullum adorabile est Creator:*

*Omne simulachrum est adorabile.*

*Ergo, Nullum simulachrum est Creator.*

Which is a true conclusion.

From whence it cannot be judged that the Conclusion of Syllogisms doth of necessity compel assent, nor that the Conclusion doth necessarily depend upon the Premisses.

Therefore as the truth is not contained or hid in a ly, nor the knowledge of it: so the consequent is, that the knowledge of the conclusion is not necessarily included in the Premisses

*John Webster, The Examination of Academies, 1654*

Their Conclusions do not necessarily compell Assent,  
*viz.* *M. Webster* is one who can grant the premises in a  
true Syllogisme, and yet deny the conclusion.  
I Answere this is by a speciall gift.

*Seth Ward, Vindiciae Academicarum, 1654*

We say not that in syllogisms which of necessity compels assent is the conclusion itself, but the premises, when out of them it is rightly proved (i) when the premises both are true and well ordered in Mood and figure, Assent to the conclusion is made necessary.

(...) The conclusion indeed doth necessarily depend upon the premises, in respect of the forme at least, as the conclusion of a true syllogisme, and so doth that of his syllogisme before mentioned.

*'A very learned pen' in Examen Examinis,  
1654*

# Thomas Hobbes, Elements of Philosophy (1656)



## The Titles of the CHAPTERS. The first Part, or Logique.

- C H A P. I.**  
 1 Of Philosophy.  
 2 Of Names.  
 3 Of Propositions.  
 4 Of Syllogisms.  
 5 Of Errors, Fallacies and Captious.  
 6 Of Notions.  
 The Second Part, or The first Grounds of Philosophy.  
 7 Of Place and Time.  
 8 Of Body and Accident.  
 9 Of Cause and Effect.  
 10 Of Power and Will.  
 11 Of Identity and Difference.  
 12 Of Quantity.  
 13 Of Analogies, or the same Proportion.  
 14 Of Straight and Crooked, Angle and Figure.  
 The third Part, Of the Proportions of Motion and Magnitudes.  
 15 Of the Nature, Properties, and diverse considerations, of Motion and Imagination.  
 16 Of Motion Accelerated and Retarded, and of Motion by Curvature.  
 17 Of Figures Distinct.  
 18 Of the Equation of Straight Lines, with the Curved Lines of Parabolas, and other Figures made in imitation of Parabolas.  
 19 Of Angles of Incidence and Reflexion, found by Supposition.  
 20 Of the Extension of a Circle, and the Division of Arcs into Angles.  
 21 Of Circular Motion.  
 22 Of the Force of Motion.  
 23 Of the Cause of Irregularities of Motion, pressing downwards in straight parallel Lines.  
 24 Of Retardation and Reflexion.  
 The fourth Part, of Philosophy, or the Philosophy of Nature.  
 25 Of Sense and Animal Actions.  
 26 Of the World and of the Stars.  
 27 Of Light, Heat, and of Colours.  
 28 Of Cold, Wind, Meteors, Affections of Bodies here, Thunder, Lightning and Tornado, and of the Winds of Heavens.  
 29 Of Sound, Colour, Taste, and Smell.  
 30 Of Gravity.

Part I.

## COMPUTATION OR LOGIQUE.

### CHAP. I. Of Philosophy.

1. The Conclusion. 2. The Definition of Philosophy explained. 3. Relations of the Mind, 4. Propositions when they are. 5. How Propositions are known by Generation, & successively. 6. The Sources of Philosophy. 7. The Utility of it. 8. The Method. 9. The Parts of it. 10. The Epilogue.



PHILOSOPHY seems to me to be amongst men now, in the same manner as Cereals and Wine are said to have been in the world in ancient times. For from the beginning there were Vines and Ears of Corn growing here and there in the fields; but no care was taken for the planting and sowing of them. Men lived therefore upon Akorns; or if any were so bold as to venture upon the eating of their unknown and distasteful fruits,

they did so with danger of their health. In like manner, everyman brought Philosophy, that is, Natural Reason, into the world with him; for all men are capable to some degree, and concerning some things; but where there is need of a long series of Reason, there still men wander out of the way, and fall into Error for want of Method, as if were for want of sowing and planting, that is, of improving their Reason. And from hence it comes to pass, that they who content themselves with daily experience, which may be likened to feeding upon Akorns, and who regard Philosophy,



## The first Part, or Logique.

### CHAP.

- 1 Of Philosophy.
- 2 Of Names.
- 3 Of Propositions.
- 4 Of Syllogismæ.
- 5 Of Erring, Falsity and Captions.
- 6 Of Method.

- **revolutionary developments in mathematics, philosophy, natural science**
- **logic 'asleep'**





**Pièrre Gassendi**

**Institutio Logica (1658)**

**Pars Prima: De Simplici Imaginatione**

**Pars Secunda: De Propositione**

**Pars Tertia: De Syllogismo**

**Pars Quarta: De Methodo**

## **PREMIERE PARTIE**

contenant les réflexions sur les idées, ou sur la première action de l'esprit, qui s'appelle concevoir

## **SECONDE PARTIE**

contenant les réflexions que les hommes ont faites sur leurs jugements

## **TROISIEME PARTIE**

du raisonnement

## **QUATRIEME PARTIE**

de la méthode

*Arnauld & Nicole, La Logique ou l'Art de Penser, 1662*

acters.)

So that the tradition of Learning, or facilitation of it would be but little advanced by this meanes. But it did presently occurre to me, that by the helpe of Logick and Marhematicticks this might soone receive a mighty advantage, for all Discourses being resolv'd in sentences, those into words, words signifying either simple notions or being resolvible into simple notions, it is manifest, that if all the sorts of simple notions be found out, and have Symboles assigned to them, those will be extreamly few in respect of the other, (which are indeed Characters of words, such as *Tullius Tiro's*) the reason of their composition easily known, and the most compounded ones at once will be comprehended, and yet will represent to the very eye all the elements of their composition, & so deliver the natures of things: and exact discourses may be made demonstratively without any other paines then is used in the operations of specious Analyties.

Seth Ward, *Vindiciae Academicarum* (1654)

**Ars Signorum,**  
VULGO  
CHARACTER UNIVERSALIS  
ET  
LINGUA PHILOSOPHICA.

*Qua poterunt, homines dicere: Effenturque Idiomatum,  
Pars illarum septimanarum, omnia Antea sua  
sensa (in Rebus Familiaribus) non minus intelli-  
gibiliter, sive scribendo, sive loquendo, mutuo com-  
municare, quam Linguis propriis Ver aculis. Prae-  
terea, hinc etiam poterunt facere, Philosophiae  
Principia, & veram Logicam Praxin, citius & fa-  
cilius multo imbibere, quam ex vulgariis Philo-  
sophorum Scriptis.*

*Auctore Geo. Dalgarno, — hoc ultra.*

LONDINI,

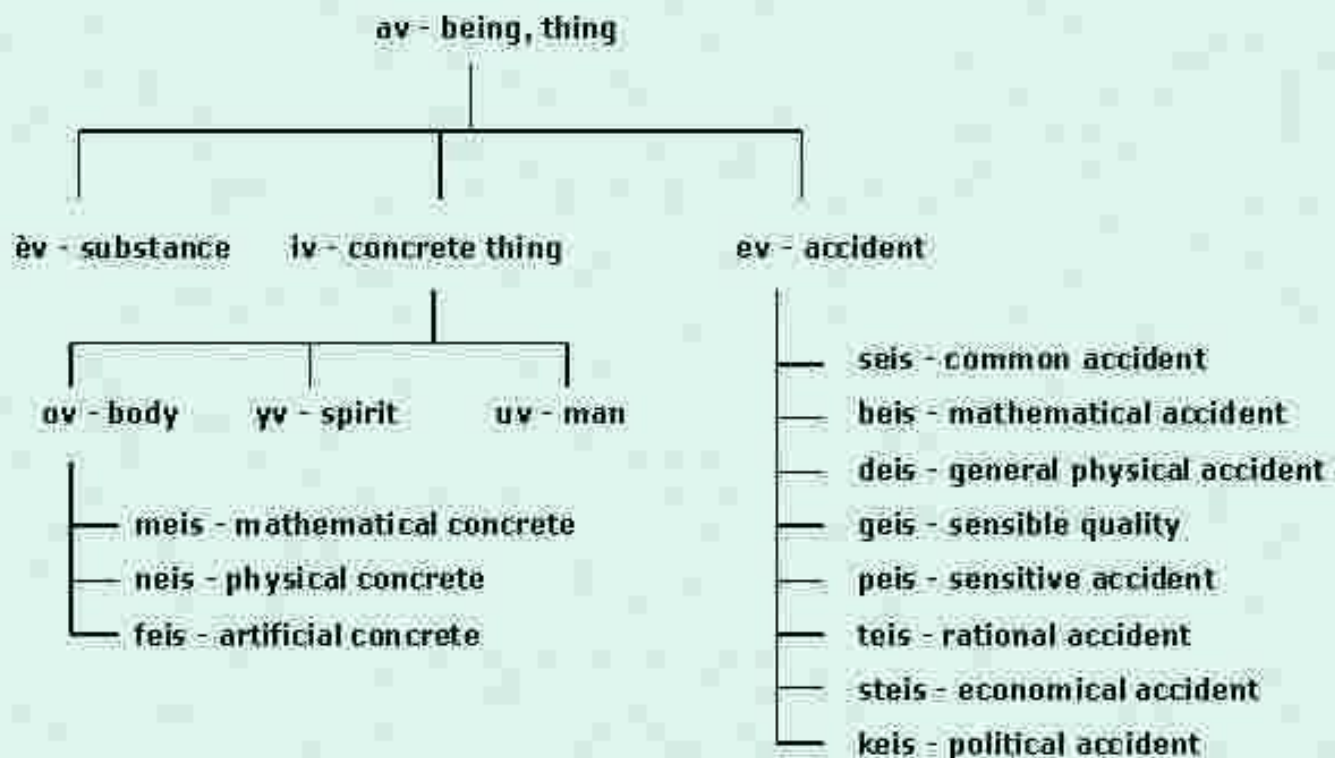
Excudebat J. Hayes, Sumptibus Auctoris;  
Anno reparatae salutis, 1661.

**The Art of Signs  
OR  
A UNIVERSAL CHARACTER  
AND  
PHILOSOPHICAL LANGUAGE**

By means of which speakers of the most diverse languages will in the space of two weeks be able to communicate to each other all the notions of the mind (in everyday matters), whether in writing or in speech, no less intelligibly than in their own mother tongues.

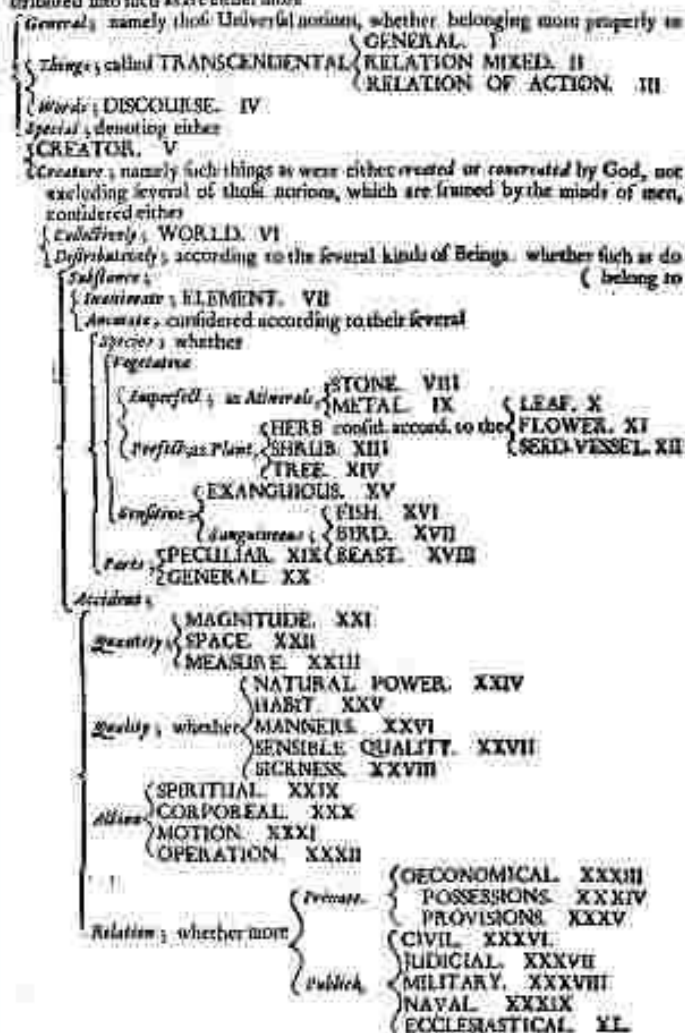
Furthermore, by this means also the young will be able to imbibe the principles of philosophy and the true practice of logic far more quickly and easily than from the common writings of philosophers.

**George Dalgarno, Ars Signorum 1661**



**John Wilkins**  
**An Essay towards a Real**  
**Character and a Philosophical**  
**Language**  
**1668**

All kinds of things and notions, to which names are to be assigned, may be distributed into such as are either most





*John Locke*  
*An Essay concerning Human Understanding*  
*1689*

**“To this abuse, and the mischiefs of confounding the Signification of Words, Logick, and the Liberal Sciences, as they have been handled in the Schools, have given Reputation; and the admired Art of Disputing, hath added much to the natural imperfection of Languages, whilst it has been made use of, and fitted, to perplex the signification of Words, more than to discover the Knowledge and Truth of Things”**



*Gottfried Wilhelm Leibniz*  
*New Essays on Human Understanding*  
1702-1704

“Your complaints are largely justified. Yet there are, though rarely, obscurities which are pardonable and even laudable (...)

As for *logic*: since it is the art which teaches us how to order and connect our thoughts, I see no grounds for laying blame upon it. On the contrary, men’s errors are due rather to their lack of logic.”



- \* logic indispensable part of education
- \* several years of training in logic at undergraduate level
- \* logic as an art, defined as
  - *the art of reason, or an instrumental art directing our mind to knowledge (Sanderson)*
  - *the art (or skill) of reasoning, directing the mind in the use of reason (Wallis)*
  - *an art which teaches us to dispute probably on both sides of any matter that is propounded (Blundeville)*
  - *an instrument to discern truth from falsity (Spiegelhel)*

## **contents of textbooks:**

- terms (categories, predicables)**
- propositions (opposition, conversion)**
- discourse (syllogisms)**
  
- other subjects (fallacies, topics)**

# Robert Sanderson, Logicae Artis Compendium (1614)

## ELENCHVS CAPITVM

### PARS PRINA.

*De simplicibus Terminis.*

CAP.	PAG.
1. Praecipua de Naturâ Logica.	1.
2. De Pradicabilibus in genere.	5.
3. De Generi, Specie, & Individuo.	8.
4. De Differentiâ.	14.
5. De Proprio & Accidente.	17.
6. De tribus definitionibus Antepredicamentalis.	20.
7. De Reliquis Antepredicamentis.	24.
8. De Predicamento in genere.	29.
9. De Predicamento Substantia.	31.
10. De Predicamento Quantitatis.	34.
11. De Predicamento Qualitatis.	37.
12. De Predicamento Relationis.	42.
13. De Predicamento Affirmis & Passivis.	46.
14. De Quatuor ultimis predicamentis.	49.
15. De Oppositis.	54.
16. De reliquis Post-predicamentis.	58.
17. De Definitione.	61.
18. De Divisione.	62.
19. De Identitate & Diversitate.	69.

¶ 2

PARS

### PARS SECVNDA.

*De Propositionibus.*

1. De Propositionum partibus.	75.
2. De Suppositione Terminorum.	82.
3. De Ampliatione & Restrictione.	89.
4. De Diversis Propositionibus.	93.
5. De Oppositione Propositionum Categoriarum de Inesse.	101.
6. De Equipollentia earundem.	106.
7. De Conversione earundem.	109.
8. De Modis.	111.
9. De Exponibilibus.	117.
10. De Hypotheticis.	121.

### PARS TERTIA.

*De Dialecticâ.*

1. De Argumentatione.	127.
2. De Partibus Syllogismi.	130.
3. De Fundamento Formae Syllogisticae.	134.
4. De tribus Syllogismorum figuris.	138.
5. De Reductione Syllogismorum.	141.
6. De Inventionis modis terminis.	147.
7. De Syllogismis quibusdam specialibus.	151.
8. De Enchymemate, & Sorite.	151.

9. De Syllogismo hypothetico.	157.
10. De Inductione & Exemplo.	150.
1. De Fine & Praecipuis Demonstrationibus.	152.
2. De Conditionibus Propositionum Demonstrationis absolutis.	166.
3. De Conditionibus Propositionum relativis.	172.
4. De Demonstrationis variis gradibus.	174.
5. De Demonstratione Activa.	180.
6. De Demonstratione passiva.	183.
7. De Syllogismo Topico in genere.	188.
8. De Locis Topicis in genere.	191.
9. De Locis à Causâ, & Effectu.	194.
10. De Locis à Subiecto, & Accidente.	197.
1. De Locis à Distanciâ, & Comparatione.	201.
2. De Locis à Contingentia, & Negatione.	207.
3. De Locis à Toto & Parte.	210.
4. De Locis à Genere & Specie.	211.
5. De Locis à definitione, & divisione.	214.
6. De Loco à Testimonio.	216.
7. De Fallaciis in Genere.	219.
8. De Fallaciis in divisione.	221.
9. De Fallaciis extra divisionem.	226.
10. De Methodis in Genere.	232.
1. De Methodis in specie.	236.

APPEN.

# John Wallis, Institutio Logicae (1686)

## INDEX CAPITUM.

### PARS PRIMA.

#### De Apprehensione Simplici.

- C**AP. I. De Verbis, earumque Significatione.  
II. De Individuis, Particularibus, seu Singularibus.  
III. De Verbis Communitibus, seu Universalibus.  
IV. De Predicabilibus tribus primariis; *Quare, Quare, & Differentia*.  
V. De duabus posterioribus Predicabilibus; *Propria, & Accidentia*.  
VI. De Substantia, Accidente, & decem Predicamentis.  
VII. De Predicamento Substantie.  
VIII. De Predicamento Quantitatis.  
IX. De Predicamento Qualitatis.  
X. De Predicamento Relationis.  
XI. De Predicamento Affinitatis & Oppositionis.  
XII. De Predicamento Ubi & Quando.  
XIII. De Predicamento Itius.  
XIV. De Predicamento Habitus.  
XV. De Antepredicamentis & Postpredicamentis.  
XVI. De Oppositione Simplicium Terminorum.  
XVII. De Modis Fitis & Similibus.  
XVIII. De Modis & Habitibus.  
XIX. De Causa & Effectu.  
XX. De Subiecto, Objecto, Adjuncto.  
XXI. De Diti & Partibus; Divisione & Distributione.  
XXII. De Entis & Diversis.  
XXIII. De Definitione & Descriptione.

### PARS SECUNDA.

#### De Secunda operatione Intellectus.

- C**AP. I. De Propositione.  
II. De Partibus Propositionis Categorice.  
III. De Qualitate Propositionis; *Affirmativa & Negativa*.  
IV. De Quantitate Propositionis; *Universali & Particulari*.  
V. De Oppositione Propositionum.  
VI. De Equivalence Propositionum.  
VII. De Conversione Propositionis.  
VIII. De Propositionum Modis.  
IX. De Propositionibus, *Enunciatis, Exemptis, Reduplicatis;*  
*verisque Propositionum Suppositionibus.*

X. De

## INDEX CAPITUM.

- X. De Propositionibus Hypothesis.  
XI. De Propositionibus Copulativis & Disjunctivis.

### PARS TERTIA.

#### De Tertia operatione Intellectus.

- C**AP. I. De Argumentatione.  
II. De Syllogismo.  
III. De Tribus Figuris.  
IV. De Modis.  
V. De Fundamento Syllogismi; & Modis Figuræ primæ.  
VI. De Reductione Syllogismorum; & Modis secundæ Figuræ.  
VII. De Modis Tertie Figuræ.  
VIII. De Modis Inversis.  
IX. De Quarta Figura.  
X. De Modis Propriis.  
XI. De Syllogismo Explicativo.  
XII. De Inveniendis Modis; & Modis Tertius.  
XIII. De Enthymemate, Barite, aliisque Syllogismorum Accidentibus.  
XIV. De Syllogismo Obliquis; & Modalibus.  
XV. De Inductio & Exemplo.  
XVI. De Syllogismo Hypothesis, Conditionalibus, Temporalibus, & Locutibus.  
XVII. De Syllogismo Disjunctivo.  
XVIII. De Syllogismo Negativo Copulativo.  
XIX. De Dilemmate, seu Syllogismo Distributivo.  
XX. De Fallaciis.  
XXI. De Materia Syllogismorum.  
XXII. De Demonstratione.  
XXIII. De Syllogismo Topico.  
XXIV. De Methode.

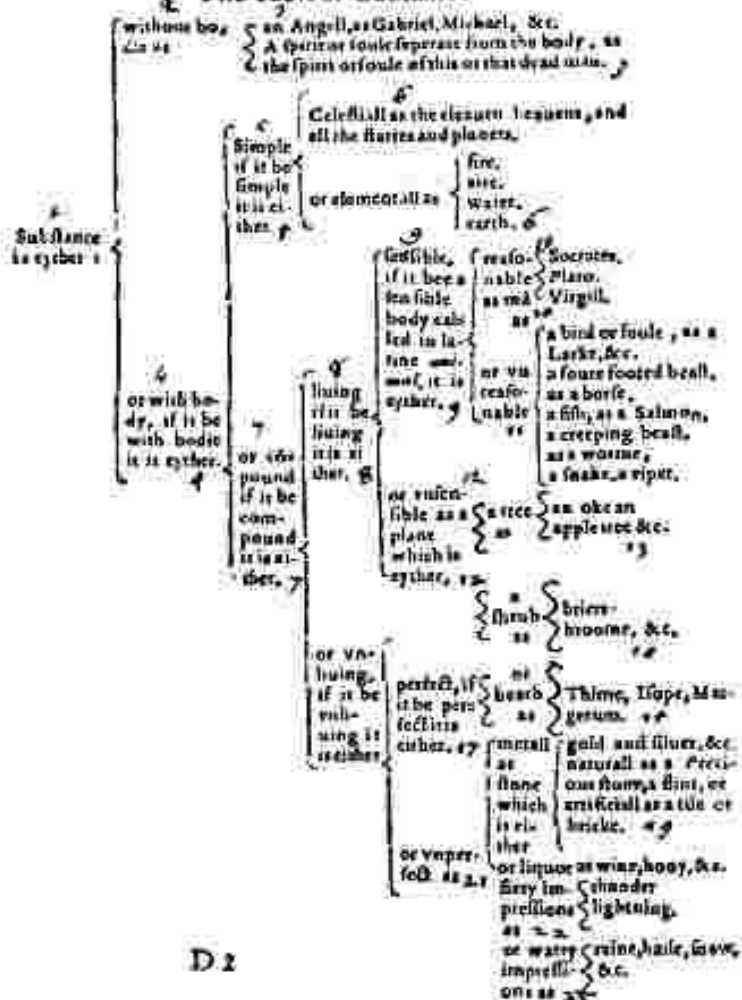
### THESES TRES.

- T**HESIS I. *Propositio Singularis, in Dispositione Syllogistica*  
*semper habet rem Universalem.*  
II. *Syllogismi Hypothesis, aliquæ Compositi, referendi sunt omnes*  
*ad Aristotelicos Categoricos, & Modos.*  
III. *Quantitas non differt Realiter a Re Quantæ.*

LOGICA

Blundeville  
(1599)  
Porphyrian  
Tree

The Table of Substance



**Blundeville  
(1599)  
Square of  
opposition**

