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
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 meerly 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

- Aristotle, Stoics
- Medieval Period
- 15th-17th Cent.
- Leibniz
- 18th Cent.
- 19th: Bolzano, Mill
- Boole, De Morgan, Peirce
- Frege
- Dev. after Frege
“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 paradoxicae 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 doe 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 Academiarum, 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
The Title of the CHAPITERS.
The First Part, of Logique.
  2. Of Necessity.
  3. Of Proportion.
  4. Of Syllogism.
  5. Of Verbal and Verbeaux.
  The Second Part, of the First General of Philosophy.
  7. Of Place and Time.
  8. Of Body and Accident.
  9. Of Unity and Ethis.
  10. Of Number.
  11. Of Magnitudes, or the Same Proportion.
  12. Of Diametrical and Divided, Angle and Figures.
  The third Part, of the Proportion of Motion and Magnitudes.
  13. Of the Nature, Proportion, and Several Conversions of Action and
      Obstacul.
  15. Of Figures Definit.
  16. Of the Explication of Straight Lines, which the Geometrica
      Proportionat.
  17. Of Diametrical and Divided, Angle and Figures, made by Supposition.
  18. Of Angles of Resistance and Reflection, and by Supposition.
  20. Of Angles, or the Definition of Angles.
  22. Of the Force of a Body.
  23. Of the Force of the Propertions of Bodies, which press amongs
      them.
  25. The Fourth Part, of Physics, or the Phenomena of Nature.
  27. Of the World and of the Stars.
  29. Of Cold, Wind, and other Phenomena of the Air, Experiments
      Lightening and Consuming, and of the World of Atoms.
  30. Of Gravity.

Part I. COMPUTATION OR LOGIQUE.
  Chap. I. Of Philosophy.
  1. Of the Definition of Philosophy explained.
  2. Of the Nature, Propertions, and several Conversions of Action and
      Obstacles.
  3. Of Motion Accelerated and Retarded, and of Action by Consequences.
  4. Of Figures Definit.
  5. Of the Explication of Straight Lines, which the Geometrica
      Proportionat.
  6. Of Diametrical and Divided, Angle and Figures.
  7. Of the Force of a Body.
  8. Of the Force of the Propertions of Bodies, which press amongs
      them.
  10. The Fourth Part, of Physics, or the Phenomena of Nature.
  14. Of Cold, Wind, and other Phenomena of the Air, Experiments
      Lightening and Consuming, and of the World of Atoms.
  15. Of Gravity.
The first Part, or Logique.

CHAP.
1. Of Philosophy.
2. Of Names.
3. Of Proportion.
4. Of Syllogisme.
5. Of Erring, Falsity and Captions.
• revolutionary developments in mathematics, philosophy, natural science

• logic ‘asleep’
Piére Gassendi
Institutio Logica (1658)

Pars Prima: De Simplici Imaginatione
Pars Secunda: De Propositione
Parts 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
So that the tradition of Learning, or faciliation of it would be but little advanced by this means. But it did presently occur to me, that by the helpe of Logick and Mathematiticks this might soone receive a mighty advantage, for all Discourses being resol
ved 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 extremely few in respect of the other, (which are indeed Characters of words, such as Titius Tito's) the reason of their composition easily known, and the most compounded ones at once will be comprehended, and yet will repre-
sent to the very eye all the elements of their composition, & to de-
liber the natures of things: and exact discourses may be made de-
monstratively without any other paines then is used in the opera-
tions of Specious Analytics.

Seth Ward, Vindiciciae Academiarum (1654)
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
### Chap. I. The General Scheme.

All kinds of things and motions, to which names are to be assigned, may be distributed into such sorts or classes as:

- General, namely those Universal notions, whether belonging more properly to
- The generation, called TRANSCENDENTAL, or RELATION MIXED.
- RELATION OF ACTION.
- World.
- Discourse.
- Spirit.
- Denoting either
- Creator.
- Creature, namely such things as were either created or conserved by God, not excluding several of their motions, which are framed by the minds of men, considered either
- Generically, WORLD.
- Distinctly, according to the several kinds of Being, whether such as do
- Belong to
- Elements.
- Actions, considered according to their several

<table>
<thead>
<tr>
<th>Species</th>
<th>General</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetative</td>
<td></td>
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<tr>
<td>Imperfect</td>
<td>Mineral</td>
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<tr>
<td>Stone</td>
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<td>Flower</td>
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Accident:

- Magnitude
- Space
- Measure
- Natural Power
- Habit

Reality, whatever

- Manners
- Sensible Quality
- Sickness

Spiritual

Corporeal

Motions

Operation

Private

Public

Economical

Possessions

Provisions

Civil

Judicial

Military

Naval

Ecclesiastical
“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”
"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 (Spieghel)
contents of textbooks:

- terms (categories, predicables)
- propositions (opposition, conversion)
- discourse (syllogisms)

- other subjects (fallacies, topics)
<table>
<thead>
<tr>
<th>Elenchus Capitum</th>
<th>Pars Prima</th>
<th>De Simplicibus Terminis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cap.</td>
<td>PAG.</td>
<td></td>
</tr>
<tr>
<td>1.</td>
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<td>19.</td>
<td>19</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pars Secunda</th>
<th>De Propositionibus</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>De Syllogismis primis,</td>
</tr>
<tr>
<td>2.</td>
<td>De Syllogismis secundis,</td>
</tr>
<tr>
<td>3.</td>
<td>De Syllogismis tertius,</td>
</tr>
<tr>
<td>4.</td>
<td>De Syllogismis quaternis,</td>
</tr>
<tr>
<td>5.</td>
<td>De Syllogismis quinquennis,</td>
</tr>
<tr>
<td>6.</td>
<td>De Syllogismis sexennis,</td>
</tr>
<tr>
<td>7.</td>
<td>De Syllogismis septennis,</td>
</tr>
<tr>
<td>8.</td>
<td>De Syllogismis octennis,</td>
</tr>
<tr>
<td>9.</td>
<td>De Syllogismis novennis,</td>
</tr>
<tr>
<td>10.</td>
<td>De Syllogismis decennis,</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pars Tertia</th>
<th>De Dicuntur</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>De Argumentatione,</td>
</tr>
<tr>
<td>2.</td>
<td>De Partibus Syllogismi,</td>
</tr>
<tr>
<td>3.</td>
<td>De Fundamenta Formae Syllogistica,</td>
</tr>
<tr>
<td>4.</td>
<td>De subjectis Syllogismi figuris,</td>
</tr>
<tr>
<td>5.</td>
<td>De Reductio Syllogismorum,</td>
</tr>
<tr>
<td>6.</td>
<td>De Syllogismis medii termini,</td>
</tr>
<tr>
<td>7.</td>
<td>De Syllogismis quinuennialibus,</td>
</tr>
<tr>
<td>8.</td>
<td>De Enchymate &amp; Seriis,</td>
</tr>
</tbody>
</table>

| Appendices |
|------------|----------------|
| 1.         | De Syllogismis hypotheticis, | 157 |
| 2.         | De Inductive & Exemplis, | 150 |
| 3.         | De Fine & Pragmatis Demonstrationibus, | 152 |
| 4.         | De Conditionibus Propositorum, | 166 |
| 5.         | De Conditionibus Propositorum absolutis, | 172 |
| 6.         | De Conditionibus Propositorum relatvis, | 173 |
| 7.         | De Demonstrationibus variis gradibus, | 174 |
| 8.         | De Demonstrationibus Abstr. | 180 |
| 9.         | De Demonstrationibus propositionum, | 183 |
| 10.        | De Syllogismis Tertius in generis, | 188 |
| 11.        | De Leucis Teopis in generis, | 191 |
| 12.        | De Leucis & Accidens, | 194 |
| 13.        | De Leucis & Accidentis, | 197 |
| 14.        | De Leucis & Accidentibus & Comparationibus, | 201 |
| 15.        | De Leucis & Coniecturis & Notationibus, | 207 |
| 16.        | De Leucis & Terra & Varte, | 210 |
| 17.        | De Leucis & Geners & Species, | 211 |
| 18.        | De Leucis & definitiones & divisi, | 214 |
| 19.        | De Leucis & termini, | 216 |
| 20.        | De Cal macros & termini, | 219 |
| 21.        | De Fallacius in generis, | 221 |
| 22.        | De Fallacius in dividis, | 222 |
| 23.        | De Methodus in generis, | 226 |
| 24.        | De Methodus in specie, | 226 |

| PARS |
INDEX CAPITUM.

PARS PRIMA.
De Appreciatione Simplici.

CAP. I. De Finitio, nempeque significat.
II. De Indicativa, Particulativa; seu Singulariter.
III. De Medietate Compositi, seu Universalia.
IV. De Predicamentis; quibus primisae; Genus, Species, Differentiae.
V. De aequo positivo, Predicabilibus, Proprietatibus, Accidents, &c.
VI. De Emphatico, Accurato, & Deducere Predicamentis.
VII. De Predicamentis Substantialibus.
VIII. De Predicamentis Consequentiae.
IX. De Predicamentis Equivocis.
X. De Predicamentis Relativis.
XI. De Predicamentis Obligati & Prepositi.
XII. De Predicamentis Usi & Rigendi.
XIII. De Predicamentis Simplicibus.
XIV. De Predicamentis Habiti.
XV. De Non-predicamentis & Non-predicavitibus.
XVI. De Oppositione Simplicia Terminorum.
XVII. De Medietate Vacuo & Simile.
XVIII. De Motu & Motatio.
XIX. De Caelo & Subiecta.
XX. De Subiecto, Obiecto, Adjuntivo.
XXI. De Idea & Principi, Disponibilibus & Distributis.
XXII. De Aditus & Declar.
XXIII. De Definitio & Interpretatione.

PARS SECUNDA.
De Secunda operatione Intelligens.

CAP. I. De Proposicionibus.
II. De Partibus Propositionum Categorica.
III. De Qualitate Propositionum: affirmativa & negativa.
IV. De Modo Propositionum: Universale & Particulare.
V. De Oppositione Propositionum.
VI. De Consequentia Propositionum.
VII. De Consequentia Propositionum.
VIII. De Propositionibus Modalicis.
IX. De Propositionibus, exactis, exceptis, Reduplicatis; naturales Propositionum Supposicionibus.
X. De

INDEX CAPITUM.

PARS TERTIA.
De Tertia operatione Intelligens.

CAP. I. De Argumentatione.
II. De Synthesis.
III. De Tertia Figure.
IV. De Modo.
V. De Fundamenta Synthesis, & Modo фигурae prima.
VI. De Restitutio Synthesis, & Modo figurae secunda.
VII. De Modo Tertia Figure.
VIII. De Modo Intelligents.
IX. De Quantum Figure.
X. De Modo Prolongato.
XI. De Synthesis Exposita.
XII. De Intermiando Modo & Modo Terminale.
XIII. De Kethemametro, S contextu, alique Synthesis Accidendi.
XIV. De Synthesis Oligale, & Modalibus.
XV. De Indulgentia & Example.
XVI. De Synthesis Hypothetica, Conditionali, Temporali, &c.
XVII. De Synthesis Disjunctiva.
XVIII. De Synthesis Negativa Copulativa.
XIX. De Dilemmate, &c Synthesis Distributiva.
XX. De Fallacia.
XXI. De Materie Synthesis.
XXII. De Demonstrativae.
XXIII. De Syntagma Topica.
XXIV. De Methodo.

TESES TRES.

THESE. I. Proposicionis singularis, in dispositiis Synthesis, temporebus; secundo Universale.
II. Synthesis hypothesica, alique compotitae, referendi sunt sunt ad Aristoteles Categoriam Modo.
III. Argumentis, quos diverso Realiter & Re Squanto.

LOGICA
Blundeville (1599)
Square of opposition