Rediscovery of Aristotle.

- Until 1100: *Logica vetus*.
  - Aristotle, *Categoriae* (Boëthius).
  - Aristotle, *De interpretatione* (Boëthius).
  - Porphyrios, *Isagoge*.
- c.1120: Rediscovery of Boëthius' translations of
  - Aristotle, *Prior Analytics*.
  - Aristotle, *Topica*.
  - Aristotle, *Sophistici Elenchi*.
- c.1150: James of Venice translates
  - Aristotle, *Posterior Analytics*.
  - Aristotle, *De anima*.
  - Aristotle, *Metaphysica*.

Logica Nova.

Bernard G. **Dod**, Aristoteles Latinus, *in:* N. Kretzmann, A. Kenny, J. Pinborg (*eds.*), The Cambridge History of Later Medieval Philosophy, Cambridge 1982, p. 45-79

The historical situation around 1200.

- **Resources.** Rediscovery of Aristotle leads to a lot of new material.
- **Institutions.** The centres of learning (Paris, Oxford, ...) institutionalise learning in the Universities.
- *Consolidation of the XIIIth century.* Embedding of Aristotelian teaching into the Christian philosophy.

(Saint) **Albert the Great**
Albertus Magnus (c.1200-1280)
Doctor Universalis.
Founder of the *studium generale* in Cologne (1248).
Predecessor of modern concept of sciences:
The aim of natural science is not simply to accept the statements of others, but to investigate the causes that are at work in nature.

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(Saint) **Thomas Aquinas** (1225-1274)
Student of Albert the Great.
Doctor Angelicus.

The birth of the university (1).

- *Pre-universities.*
  - Law School of Bologna since the early XIth century (*"Bononia docet"*).
  - Cloister schools and cathedral schools in Paris (*e.g.*, the cathedral school of Notre Dame).
- *Problems.*
  - Non-citizen students and scholars in the cities.
  - High prestige of the education requires canonical procedures.
  - Intellectual atmosphere is hard to control for the church.

The birth of the university (2).

- Bologna (c.1200). Non-Bolognese **students** form interest groups, the so-called *nationes* or *universitates*.
  - *universitas legistarum citramontanorum*,
  - *universitas legistarum ultramontanorum*,
  - *universitas artistarum et medicorum*,
  - *collegium doctorum*.
- Paris (c.1200). Parisian educational institutions plan a more systematic way of teaching organisation, forming a *universitas*.
  - *Facultas Artium.*
  - *Facultas Iurisprudentiae.*
  - *Facultas Medicinae.*
  - *Facultas Theologiae.*

The birth of the university (3)

The Bologna model (*modus Bononiensis*).

- Each *universitas* elects their own *rector* (a student).
- No colleges.
- No university-wide structure.

The Paris model (*modus Parisiensis*).

- Each faculty has their own administration (*decanus*, Dean; *quaestor*, financial officer), elected by the *magistri*.
- *Concilium generale*, dominated by the *magistri* of the *Facultas Artium*. Elects *rector*, normally a professor.
- Colleges, offering accommodation for poor students (and sometimes professors).

Early universities.

- **Bologna** (c.1200), **Paris** (c.1200)
- Oxford (1212)
- Salamanca (1218)
- Montpellier (1220)
- Naples (1224)
- Cambridge (1225)
- Toulouse (1229), Orléans (c.1235), Papal Rome (c.1245), Piacenza (1248), Angers (c.1250), Sevilla (1254), Valladolid (c.1290), Lisbon (c.1290), Lerida (c.1300), Avignon (1303), City of Rome (1303), Perugia (1308), Treviso (1318), Cahors (1332), Grenoble (1339), Pisa (1343), Prague (1348), Florence (1349), Perpignan (1350), Huesca (1354), Arezzo (1355), Siena (1357), Pavia (1361), Cracow (1364), Orange (1365), Vienna (1365), Pécs (1367), Lucca (1369), Erfurt (1379), Heidelberg (1385), Cologne (1388), Ferrara (1391), Buda (1395).
- **1400:** 30. **1500:** 60. **1600:** 110. **1700:** 150.

Teaching in the *Trivium*.

- **Grammar.**
  - Aelius Donatus, *Ars minor*, *Ars maior*.
  - Priscianus, *Institutiones grammaticae*.
- **Logic / Dialectic.**
  - *Logica vetus et nova*.
  - Petrus Hispanus, *Summulae logicales*.
  - William of Ockham, *Summa logicae*.
- **Rhetoric.**
  - Cicero.
  - Quintilianus, *Institutio oratoria*.

The academic career.

Nullus sit scholaris Parisius qui certum magistrum non habet.

- *Schola* / *Familia Scholarum*, headed by a *magister*.
- The *magister* guides the student socially and academically to the baccalaureate.
- After that, the scholar starts an teaching assistantship with his *magister*.
- After two to three years, he becomes “licentiate” after a private *rigorosum*.
- To become *magister*, there is another public ceremonial exam, the *inceptio*, in combination with a public disputation.

Scholasticism.

The XIIIth century: the Golden Age of Scholasticism.

- Reasoning and analysis (involving logic, metaphysics and semantics), based on authorities: philological and logical analysis of original texts.
- Forms: *quaestiones*, *disputationes*.

Logica nova.

- *insolubilia*: fallacies and paradoxes.
- *syncategoremata*: and, or, not, if, every, some, only, except.
- *obligationes*: a game-theoretic approach to logic.
- “Terminist logic”: *proprietates terminorum*.

Logic in the XIIth/XIIIth century.

- John of Salisbury (c.1115-1180), *Metalogicon* (1159).

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- Robert Kilwardby (c.1215-1279). Proofs of syllogistic conversion rules as syllogisms with two terms.
- Roger Bacon (1214-1292).

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- Johannes Duns Scotus (1266-1308). *Doctor Subtilis*.
- *The pseudo-Scot*. New modalities: *dubium*, *scitum*, *opinatum*, *volitum*, *dilectum*.
- William Ockham (c.1295-1349). *Entia non sunt multiplicanda praeter necessitatem.*

Via moderna (1).

- XIIth century. *Parvipontani* (Adam of Balsham), Petit Pont in Paris. *Fallacie Parvipontane.*
- *Quaestiones Victorinae* (school of William of Champeaux, 1100-1150).
- Golden Age of Terminist Logic: 1175-1250.
  - *Ars Meliduna* (1170-1180).
  - *Tractatus Anagnini* (1200-1220).
  - William of Shyreswood (Shireswood/Sherwood, 1190-1249): *Introductiones in Logicam* (c.1230-1240).
  - Petrus Hispanus (Pope John XXI.; c.1205-1277): *Summulae Logicales* (c.1230-1240).

Via moderna (2).

- **Oxford School.**

  Influenced by the *Parvipontani*.

  Main representative. William of Shyreswood.

- **Paris School.**

  Main representative. Petrus Hispanus.

- **Modists** (XIIIth and XIVth century).
  - “speculative grammar” based on *modi*.
  - Boëthius of Dacia (d.1290)
  - Pierre d’Auvergne (d.1303)
  - Martin of Dacia (d.1304)
  - Thomas of Erfurt (c.1330)
  - Johannes Aurifaber (c.1330)

Via moderna (3).

Via Antiqua.

- *logica vetus* (in particular, the *Categoriae*).
- Thomistic realism.

- John Wyclif (c.1330-1384).

Via Moderna.

- *logica nova*.
- Semantical analysis.
- Nominalism.

- The Terminists.
- The Modists.
- Walter Burley (c.1275-1344).
- William Ockham (c.1295-1349).

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XIVth and XVth century. Philosophy sharply divided into *via antiqua* and *via moderna*.

Termistic logic (1).

Moving from analysis of meaning in words (what does *homo* mean?) to analysis of meaning of terms in phrases (what part of the meaning of *homo* is responsible for the fact that "*omnis homo mortalis est*" is true?).

- Syllogistics doesn't analyse the truth-status of categorial propositions any further.
- Linguistic analysis (predication vs non-predication) at the basis of the theory of categories.
- Grammar investigated the meaning of single words (outside of the context of propositions).
- Origins in the school of Chartres (c.1030): 'contextual approach' (de Rijk, 1967).

Termistic logic (2).

Subtle questions.

- Compare *“homo est animal”*, *“homo est species”*, and *“homo est disyllabum”*.
  In each of the cases, the meaning of *homo* is slightly different.
- What do qualifi ers do with meanings?
  If I go from *“omnis homo est philosophus”* to *“paene omnis homo est philosophus”*, how does the explanation for the meaning change?

Syncategoremata.

- Grammarians' defi nition. A term is a categorema if it can be the subject or the predicate of a proposition. Other meaningful terms are syncategoremata.
- **Example 1.** *Socrates currit*.
- **Example 2.** *Socrates non currit*.
- Logicians' defi nition. An incomplete list of about fi fty words that are discussed as syncategorematic.Among them are words like omnis.
- Important syncategoremata: *et*, *ut*, *cum*, *vel*, *omnis*, *uterque*...

Suppositio (1).

- An analysis of the meaning of terms in propositions: *Suppositio* as a theory of reference.
- **Situation 1.**
  - Under what conditions is *omnis homo philosophus est* true?
  - If *philosophus* supposits for every instance of *homo* (*suppositio mobilis*).
  - *Instantiation: Aristoteles homo est. Aristoteles philosophus est.*
- **Situation 2.**
  - Under what conditions is *omnis homo praeter Socratem philosophus est* true?
  - If *philosophus* supposits for every instance of *homo* except for Socrates.
  - *Instantiation: Aristoteles homo est.* ~~*Aristoteles praeter Socrates philosophus est.*~~ (*suppositio immobilis*).

An aside.

- Latin doesn't have an indefinite article.
  - *Homo est philosophus.*
  - A man is a philosopher.
  - (Some man is a philosopher.)
  - *Aliquis homo est philosophus.*
- The medievals didn't use quotation marks.
  - *Homo est disyllabum.*
  - 'Human' is bisyllabic.

Suppositio (2).

- **Situation 3.**
  - Under what conditions is *homo est disyllabum* true?
  - If *disyllabum* supposits for every instance of *homo*. (But here, *homo* is a singular term standing for '*homo*').
  - *Flawed instantiation: Aristoteles homo est.* ~~*Aristoteles disyllabum est.*~~ (*suppositio materialis*).
- Consequences for logic: Whether conversion rules can be applied depends on the type of supposition in the proposition.

homo est disyllabum.

aliquis homo est disyllabum.

aliquis disyllabum est homo. (simple conversion)

disyllabum est homo.

Bisyllabic is a man.

Suppositio (3).

Types of *suppositio* (Spade 1982):

- *suppositio impropria*.
- *suppositio propria*.
  - *suppositio materialis*.
  - *suppositio formalis*.
    - *suppositio discreta*.
    - *suppositio simplex*.
    - *suppositio personalis*.
      - *suppositio determinata*.
      - *suppositio confusa tantum*.
      - *suppositio mobilis*.
      - *suppositio immobilis*.

Paul Vincent **Spade**, Thoughts, Words and Things: An Introduction to Late Mediaeval Logic and Semantic Theory, *preprint*

`http://www.pvspade.com/Logic/`

Suppositio (4).

- What makes *Aristoteles academicus erat* true?
- *Attempt 1.* If *academicus* supposits for *Aristoteles*. But if *academicus* supposits for *Aristoteles*, then *Aristoteles academicus est* is true.
- *Attempt 2* (modern reading). If there was a point in the past when *academicus* supposited for *Aristoteles*.
- Medieval theory: ampliation and restriction: *si terminus communis verbo de praeterito supponeret, posset supponere pro non-enti, ut hoc* homo cucurrit *verum est pro Caesare* (William of Shyreswood, *Introductiones*).
- In general: the predicate determines the type of *suppositio* and whether *ampliatio* has to be used in order to determine the truth conditions.

Fallacies: *secundum quid et simpliciter.*

Around 1120, Boëthius' translation of the *Sophistici Elenchi* is rediscovered. Aristotelian discussions of fallacies.

The Oathbreaker:

- **Oath.** I shall never leave Rome. I shall become an oathbreaker.
- **Fact.** I have left Rome.

Argument. Since I have left Rome, I broke my oath. Since I have broken, I have kept my oath. ~~I am an oathbreaker and an oathkeeper at the same time.~~ I am an oathbreaker and an oathkeeper.

secundum quid et simpliciter

- *simpliciter.* An oathbreaker is a person who breaks at least one oath.
- *secundum quid.* An oathkeeper is a person who keeps the oath.

Insolubles (1).

The most famous insoluble: **the Liar**.

This sentence is false.

φ : φ is false.

In the early literature on insolubles, there are fi ve solutions to this paradox:

- *secundum quid et simpliciter*.
- *transcasus*.
- Distinction between the exercised act and the signifi ed act.
- *restrictio*.
- *cassatio*.

Insolubles (2).

- *secundum quid et simpliciter*.
  - Mentioned by Aristotle (*Sophistici Elenchi*, 180b2-3).

Insolubles (2).

- *secundum quid et simpliciter*.
  Solution. Unclear.
- *transcasus*.
  - Derives from the Stoic *metaptosis*: differing truth-values over time.
  - When I say “I am speaking a falsehood” I am referring to what I said immediately preceding to that sentence.
  - If I didn’t say anything before that, then the sentence is just false.

Insolubles (2).

- *secundum quid et simpliciter*.
  Solution. Unclear.
- *transcasus*.
  Solution. The Liar sentence is false.
- Distinction between the exercised act and the signifi ed act.
  - Johannes Duns Scotus, *Questiones.*
  - The exercised act of the liar is “speaking the truth”.
  - The signified act of the liar is “speaking a falsehood”.
  - The liar expresses something which is not the truth, so it is false.

Insolubles (2).

- *secundum quid et simpliciter*.
  Solution. Unclear.
- *transcasus*.
  Solution. The Liar sentence is false.
- Distinction between the exercised act and the signifi ed act.
  Solution. The Liar sentence is false.
- *restrictio*.
  - The *restringentes* do not allow assignment of truth-values to sentences with self-reference.
  - Not only the Liar, but also the following insoluble: φ : ψ is false. ψ : φ is false (linked liars)

Insolubles (2).

- *secundum quid et simpliciter*.
  Solution. Unclear.
- *transcasus*.
  Solution. The Liar sentence is false.
- Distinction between the exercised act and the signifi ed act.
  Solution. The Liar sentence is false.
- *restrictio*.
  - The *restringentes* do not allow assignment of truth-values to sentences with self-reference.
  - Not only the Liar, but also the following insoluble: φ : ψ is false. ψ : φ is false ... and ... “This sentence has five words.”

Insolubles (2).

- *secundum quid et simpliciter*.
  Solution. Unclear.
- *transcasus*.
  Solution. The Liar sentence is false.
- Distinction between the exercised act and the signifi ed act.
  Solution. The Liar sentence is false.
- *restrictio*.
  Solution. The Liar sentence does not have a truth value.
- *cassatio*.
  - If you are uttering an insoluble, you are saying nothing.
  - Therefore an insoluble has the same truth value as the empty utterance: none.

Insolubles (2).

- *secundum quid et simpliciter*.
  Solution. Unclear.
- *transcasus*.
  Solution. The Liar sentence is false.
- Distinction between the exercised act and the signifi ed act.
  Solution. The Liar sentence is false.
- *restrictio*.
  Solution. The Liar sentence does not have a truth value.
- *cassatio*.
  Solution. The Liar sentence does not have a truth value.

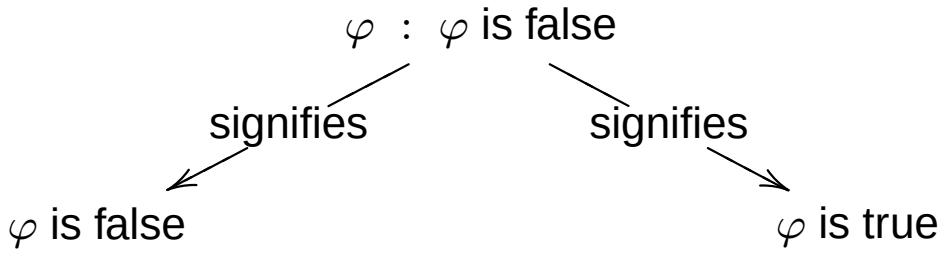
Insolubles (3).

- The most productive era in the theory of insolubles was from 1320 to 1350.
- Thomas Bradwardine (c.1295-1349).
- Roger Swyneshed (mid XIVth century).
- William Heytesbury (c.1310-1372).
- John Wyclif (c.1330-1384).
- Peter of Ailly (*Petrus de Alliaco*; 1350-1420).

Bradwardine.

Thomas Bradwardine (c.1295-1349).

- *Insolubilia*: 1321-1324.
- *Adverbial Theory of propositional signification* (Spade).
- Every sentence signifi es that it is true.
- A sentence is true if and only if everything that it signifi es is true (*sicut est*). A sentence is false if and only if there is something that it signifi es which is false (*aliter quam est*).
- The Liar sentence signifi es that it is false.



Swyneshed.

Roger Swyneshed (mid XIVth century).

- A sentence is true if and only if it signifi es *sicut est* and if it not self-falsifying. Self-falsifying sentences are always false.
- The Liar is self-falsifying, so it is false.
- *Consequence of Swyneshed's definition of truth.*
  - φ : φ is false.
  - ψ : φ is not false.
  - φ is false as it is self-falsifying. But then ψ is false, too. But φ and ψ are contradictories.

Heytesbury.

William Heytesbury (c.1310-1372).

- *1335. Regulae solvendi sophismata.*
- *The source of the paradox according to Heytesbury:* The Liar "φ : φ is false" is only paradoxical since we want to retain the usual theory of signifi cation for it. If we give that up, there is no paradox. For example, φ could signify "*Socrates currit*" which is free of paradoxes.
- But φ cannot be evaluated according to the usual theory of signifi cation. Therefore, anyone who utters φ must have some other hidden signifi cation in mind. There is no way to analyze φ further before we know which one this is.