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History of Logic: Medieval

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Seven 'liberal arts' constituted the curriculum at a medieval arts faculty. The three 'trivial' arts Grammar, Logic (*Dialectica*), and Rhetoric deal with the use of words rather than with (real) things. These are dealt with in the four mathematical arts – Geometry, Arithmetic, Astronomy, and Harmony (Music) – that comprise the *quadrivium*. The specific logical art is concerned with *reasoning*. The logical tradition is as old as Aristotle and history knows periods of intense logical activity. Thus the subject is known under many names and, at different times, knows varying boundaries. Aristotle did not use the Greek *logikè* for the logical art, but preferred *ta analytika* (from the verb *analuo*: to resolve (into premises or principles), from which the names of his 'sweet Analytics,' that is *Analytica priora and posteriora* derive. The Greek *logos* can be found in the writings of both Plato and Aristotle, where it stands for (the smallest meaningful parts of) 'speech' whereby something can be said. The Greek logical terminology was latinized by Cicero and Boethius, and the honour of having named the subject belongs to the former who coined *Logica*. 'Dialectica', the alternative Platonic and Stoic name for logic as part of the *trivium*, derives from the Greek for conversation, since, in this tradition, thinking is seen as the soul's conversation with itself. The dialectician investigates relations between (eternal) ideas which have to be respected if the thinking were to be proper. In the sixth century the logical works of Aristotle – *Categories*, *On Interpretation*, the two *Analytics*, the *Topics*, and *On Fallacies* – came to be seen as an *Organon* (instrument, tool), and the term has stuck, for example in *Novum Organon* (1620), that is, Francis Bacon's attempt to emend Aristotle's instruments for reasoning.

These names, under which the discipline has been known, relate to different aspects of logic, or of how the subject should be seen. 'Logic,' thus, would be the study of (the use of words for making) reasoned claims, and 'Analytics' resolves reasoning into simpler parts in order to provide grounds. 'Dialectics' grounds reasoning in (eternal) relations between logical entities, whereas when logic is thought of as an organon, it serves as the tool for multiplying knowledge through the use of reasoning.

The purely *formal* logic of today is regularly confined to theory of (logical) consequence between well-formed formulas (WFFs). An analogous position within medieval logic would cover only the topics dealt with in the Prior Analytics. Medieval logic, however, covers a much wider range: it comprises also topics from philosophy of

language, for example the theories of signification and supposition (reference), epistemology, for example the theory of demonstration, and philosophy of science (methodology), for example the method of analysis and synthesis. Indeed, logic is sometimes divided into Formal logic versus Material logic, which correspond to Aristotle's two *Analytics*, and cover, respectively, the theory of consequence and the theory of demonstrations (or proofs). Today's logician is primarily a 'dialectician' who studies relations among logical entities, be they meaningful sentences, (abstract) propositions, or the well-formed formulae of a formal language. The medieval logician, on the other hand, was primarily concerned with the exercise of the faculties of the intellect. The use of reasoning as part of the (human) act of demonstration was his main concern. Today the theory of consequence holds pride of place in logic over and above the theory of demonstration (which is commonly not even seen as a part of logic), but in medieval logic their order of priority was the opposite. The Posterior Analytics was in no way inferior to the Prior Analytics. The medieval logician does not primarily study consequence-relations between logical entities; his concern is the act of knowledge that is directed toward real things.

However, prior to studying proper acts of reason, one has to take into account also two other kinds of acts, since reasoning proceeds from judgments that are built from terms. In the first instance, the latter two notions are also the products of mental acts according to certain operations of the intellect, namely apprehension and judgment.

The medieval teaching on the act of reason can be summarized in tabular form:

	Operation of the intellect	Inner product of the act	Outward sign
I	*(Simple) Apprehending, Grasping*	Concept, Idea, Notion, (Mental) Term	(Written/spoken) Term
II	*Judging,* Composition/Division of two (mental)terms	Judgment (made), (Mental) Proposition: *S* is *P*	(Written/spoken) Assertion, Proposition
III	*Reasoning*, Inferring	(Mental) Inference	(Written/spoken) Inference, Reasoning

Its influence is still visible in the nineteenth century, after half a millennium, when traditional textbooks still show the time-honored structure, comprising the three parts: Of Terms, Of Judgement and Of Inference (sometimes adding a fourth, post-*Port Royal Logic* (1662), part: Of Method). It must be stressed that the medieval notion of 'proposition' that occurs twice in the second row, either as the traditional subject/copula/predicate judgment made, that is, the mental proposition, or as its outward linguistic guise, is *not* the modern one. The term *proposition* enters contemporary logic as Bertrand Russell's unfortunate (mis-)translation of Frege's *Gedanke* ('Thought'). Thus, modern propositions are not judgments, but *contents* of judgments. As such they may be given by nominalized that-clauses, for instance

that snow is white,

which emphasizes their being abstract contents. This, though, is not the way to think of medieval propositions, which are not contents, but combinations of terms S and P, for instance,

[snow is white], and [Sortes is a man].

(The fourteenth-century *complexe significabile*, though, plays a role that is somewhat analogous to that of the modern notions of proposition (content).)

In medieval logic there is a complete parallelism between thought and reality, between mind and world. The important idea of carrying out purely mechanical, 'formal,' proofs, irrespective of content, emerges only with Leibniz, and does not yet form part of the medieval tradition in logic. Owing to this logical 'picture theory' *avant la lettre* for the relation between mind and world, the theory of categories, especially in the form of simple predications, or *categorizations*, [a is an α], is sometimes seen as part of logic (as well as of metaphysics).

The medieval theories as to the truth of propositional combinations of terms – categorical predications – vary. According to one theory, the (extensional) *identity* theory, the proposition [S is P] is true when the supposition of both terms is the same, that is, when both terms stand for the same entity. Thus, for instance, the predication [Sortes is a man] is true when [Sortes] and [man] both supposit for the same entity, namely Socrates. The main rival of the identity theory of truth is the (intensional) *inherence* theory. According to it, the proposition [Sortes is a man] is true when *humanity*, the property of being a man 'inheres' in (is contained in) the nature of what *Sortes* stands for, namely, Socrates. In modern historical studies the rivalry between these medieval theories is sometimes seen as absolute. However, sometimes a philosopher is committed to (uses of) both conceptions. It seems more likely, though, that the alternative conceptions of truth-conditions pertain to different kinds of predication, than that the philosopher in question wavers between two absolute, all-encompassing theories. For instance, the substantival predication [Man is an animal] is held to be true because the terms man and animal stand for the same entity, whereas the denominative predication [A man is white] is deemed true because whiteness inheres in what man stands for.

A propositional combination of terms can be just apprehended, that is, grasped or understood; it need not be judged, or, when considered in the exterior mode, asserted. Of course, the medieval logicians also realized that not all traditional judgments have categorical [S is P] form. There are also hypothetical and disjunctive judgments, which take, respectively, the forms

[if J_1, then J_2] and [J_1 or J_2],

where J_1 and J_2 are judgments.

Terms can be divided into *general*, for instance, *man*, and *singular*, for instance, *Sortes*. Accordingly, by the correlation between world and mind/language, so can their significations, that is, there is a matching division of singular and general natures. We then get hierarchies of terms that can be ordered in a so-called *Porphyrian tree*:

Substance
Corporeal   Incorporeal
Body
Sensible   Insensible
Animal
Rational   Irrational
Rational Animal
Mortal   Immortal
Man
Sortes   Plato
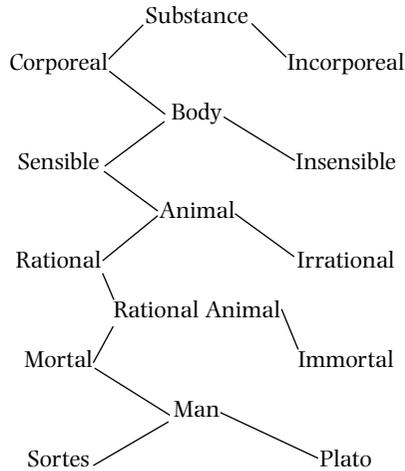
With respect to such trees, we encounter reasonings based on predications:

Sortes is a man, and man is a rational animal. *Therefore*: Sortes is an animal.

We can, however, ascend in the Porphyrian tree:

An animal is a animate living body. *Therefore*: Sortes is a living body.

Apparently, predication is transitive when climbing in a Porphyrian tree: what is predicated of a predicate of a subject, can be predicated also of the original subject.
However, not all categorical predication is transitive: the two premises

Sortes is a man and Man is a sort,

obviously, do not allow for the nonsensical conclusion

Sortes is a sort.

In order to account for the failure of transitivity in the case of iterated predication, contemporary logical semantics relies only on a (meager) *reference* relation, both relata of which, namely, the expression and its reference, are construed as *things*. Medieval logic, to its credit and great advantage, draws upon a richer spectrum of semantic notions. In effect, the medievals split our modern notion of reference into two notions, namely signification and supposition. The language studied by medieval logicians is a highly stylized, technical Latin, with rigid syntactic rules and clear meaning and in this it resembles, not our current metalinguistic predicate-calculus, but rather those interpreted formal languages that were used by Frege and others to inaugurate modern logic. The carefully crafted systems of the Polish logician Stanislaw Lesniewski are particularly close to the medieval perspective, since they were cast in the mold of traditional logic, using the [S is P] propositional form, rather than the modern, Fregean function/argument form [P(a)], as their point of departure. The expressions of these

formal languages were not seen just as things, but as *signs*, where a sign signifies by making manifest its signification to mind. The notion of *signification* is the closest medieval counterpart to our modern notion of reference. Thus, for instance, the signification of the name *Sortes* is the man Socrates and the signification of the general name *man* is such that the name can be rightly predicated of men. Signification is context-independent, but medieval logic also knows a context-sensitive notion, namely that of *supposition*. Supposition primarily applies to terms that occupy the subject position in [S is P] propositions. The supposition of a term, in a certain propositional context, is what the term stands for in the context in question. What supposition the subject term S takes depends on the signification of the predicate P. In the proposition

[Sortes is a man]

the term *Sortes* has personal supposition, because it stands for the individual Socrates. If we consider the true propositions

[Man is a sort] and [Man is a word]

the term *man* has moved from predicate to subject position. In the proposition

[Man is a word]

it has *material* supposition, because it stands for the word and not the person whence the modern use of quotation-marks is superfluous. It is the term man that has material supposition and not the term 'man.' This reverses current (Carnapian) terminology, where, when speaking about the word, one uses the 'formal,' rather than 'the material mode of speech.' The medieval terminology *material* and *formal* supposition probably derives from the fact that, under the influence of Aristotle's theory of hylemorphism, the subject S is seen as the *matter* of the categorical [S is P]-proposition, and the predicate is its *form.* Similarly, in the proposition

Man is a sort

the term man has *simple* supposition; here it stands for the *species* of men rather than for individual men. The failure of transitivity in the above inferences can then be accounted for by observing that a shift in supposition occurs in the premises: in one the supposition of *man* is formal whereas in the other it is simple, and so the inference is barred.

The theory of consequence in medieval logic, of course, treats of the Aristotelian theory of the syllogism, that is the theory of inference among categorical judgments. Such judgments have the S is P form, but they are not just simple predications such as [Sortes is (a) man]. The copula can vary both in quality and quantity. An affirmative judgment has the form [S is P] and a negative one has the form [S is not P], whereas a universal judgment has the form [all S are P] and a particular one has the form [some S are P]. Thus, for instance, a particular negative judgment takes the form [some S are not P]. Medieval logic summarized the basic inferential properties between such cate-

gorical judgments in the Aristotelian *square of opposition*. In *An. Pr.* Aristotle had organized the syllogism according to three 'figures' (subsequently also a fourth figure was considered by Galen) and determined the 'valid syllogistic modes' by means of reducing the valid modes in later figures to the 'perfect' syllogisms in the first mode. The well-known mnemonic descriptions '*Barbara, Darii, Celarent*, etc.' of the valid modes of inference were given in the Middle Ages; these descriptions provide codes for the reduction of the validity of modes in the later figures to the primitive validity of the perfect modes in the first figure. Decent expositions can be found in any number of texts on traditional logic.

As is well-known, the Aristotelian theory validates inferences that are not held to be valid in current logic. First among these is the instantiation of universal judgments:

All swans are white. *Therefore*: there is a white swan.

Aristotelian terms were reached by *epagogé* (Aristotelian induction). You grasp the concept *swan* by seeing an instance thereof, which particular exemplar serves as an *exempla gratia* for the sort in question. Thus the inference is valid and the universal categorical judgments carry 'existential import.' Today, within current predicate logic the example would be regimented as

$\forall x(\mathrm{Swan}(x) \supset \mathrm{White}(x))$. *Therefore*: $\exists x(\mathrm{Swan}(x) \mathbin{\&} \mathrm{White}(x))$

which inference is not valid. Only the step to the conclusion

$\exists x(\mathrm{Swan}(x) \supset \mathrm{White}(x))$

is valid. This, however, is not a regimentation of 'there is a white swan,' but only of 'there is something which is such that if it is a swan then it is white,' and this claim, given the premise that everything is such that if it is swan then it is white, is completely trivial as long as the universe of discourse is not empty: *any* object is such an object. The inference from an affirmative universal proposition to an affirmative particular one is an example of 'alternation.' Other similar kinds of inference concern 'descent' from the universal judgments to a conjunctive one:

All men are mortal. *Therefore*: Peter is mortal and John is mortal.

(Of course, there is no need to limit ourselves to just two conjuncts here. *Mutatis mutandis* this remark applies also to the examples given in the sequel.) Similarly,

Some men are mortal. *Therefore*: Peter is mortal or John is mortal.

is a descent to a disjunctive proposition. One can also descend with respect to *terms*:

All men are mortal. *Therefore*: John and Simon are mortal.

Aristotelian logic, when cast in the mold of traditional syllogistic theory, is a *term-logic*, rather than a logic of propositions. The medievals liberated themselves from the term-logical straitjacket of the Aristotelian syllogistics, first by considering also

syllogisms with *singular* judgments, that is, categorical [S is P] propositions of the form [s is P], where s is a *singular term*. Here the so-called *expository syllogism* played an important role:

> This thing (*hoc*) is a man, but this thing runs. *Therefore*: A man runs.

However, gradually also other forms of inference than term-logical syllogisms were studied by medieval logicians, including the pure and mixed *hypothetical* syllogisms. A pure hypothetical syllogism takes the form

> If P then Q and if Q, then R. *Therefore*: If P, then R.

The mixed forms of the hypothetical syllogism include the well-known *modus* (*ponendo*) *ponens* inference:

> If P, then Q, but P. *Therefore* Q.

Here we have left the term-logic of syllogistic theory; the connections are here not between terms, but between propositions. This shift in perspective led, (± 1300) to the appearance of a new logical genre. Then tracts bearing the title *On Consequence* begin to appear, and consequence becomes the main topic of study in medieval logic.

In such tracts rules for the holding of consequences were set out. Today, in elementary logic classes, when the analysis of natural language arguments is treated, students are taught to search for argument indicator words, such as 'thus,' 'therefore,' 'hence,' 'whence,' 'because,' etc. However, today we also make a clear distinction between implication, consequence, inference and causal grounding:

- 'implies' is an indicator-word for *implication*, which is a propositional connection between proposition(al content)s.
- 'follows from,' 'is a consequence of' and 'if . . . is true, then – is true' are indicator-phrases for *consequence*, which is a relation between proposition(al content)s.
- 'thus,' 'therefore' are indicator words for *inference*, which is a passage from premise judgment[s] (assertion[s]) to a conclusion judgment (assertion).
- 'because,' 'is a cause (ground, reason) for' are indicator words for *causal grounding*, which is a relation between events, or states of affairs.

However, in medieval logic, *si* (if), *igitur* (therefore), *sequitur* (follows) and *quia* (because) are all indicator-words for one and the same notion of a *consequentia*. This notion survives terminologically in modern logic under two different guises, namely, on the one hand, as the notion of (*logical*) *consequence* between WFFs that derive from Bolzano's *Ableitbarkeit* and that was made famous by Tarski, and, on the other hand, as the *sequents* (German *Sequenzen*) that were used by Gentzen. The medieval theory of consequences, accordingly, can rightly be seen as a partial anticipation of contemporary sequent-calculus renderings of logical systems. The modern notion of logical consequence has its medieval counterpart in the notion of a *formal* consequence, that is, one that holds 'in all terms,' for instance:

> All men are mortal. Sortes is a man. *Therefore*: Sortes is mortal.

This consequence remains valid under all (uniform) substitutions (*salva congruitate*) of other terms put in place of *Sortes*, *mortal*, and *man*. Formal consequence is opposed to *material* consequence, for instance the consequence

Sortes is a man. *Therefore*: Sortes is mortal.

holds only materially, since it does not hold 'in all terms.' Material consequence can be compared to (Carnap's contemporary notion of) 'meaning postulates.'

Another very interesting, late addition to medieval logic is the theory of *obligations*, which is concerned with the proper rules for disputation and questioning. Thus, for instance, if I have asserted a conjunctive proposition, I have incurred an obligation and might be held to be asserting each conjunct separately. This theory lies on the border-line between logic, semantics, and pragmatics, incorporating also elements of the theory of speech acts. To an amazing extent, it constitutes an anticipation of the current *dialogicial* approach to logic and semantics that was designed by Lorenzen and Lorenz, or the *game-theoretical semantics* that we owe to Hintikka.

In contemporary philosophical logic, logical paradoxes and their resolution – their diagnosis and prevention – are treated if and when they arise. Their treatment does not constitute a separate branch of logic. In (late) medieval logic, however, a novel genre was added to the standard logical repertoire and tracts devoted solely to the treatment of *Insolubilia* begin to appear.

Not all of medieval logic is confined to logic texts, though. The role that philosophy served in medieval academic life was primarily that of an *ancilla theologicae* ('a servant of theology'). Therefore, one can often find passages that are highly relevant from a logico-semantical point of view also outside tracts that are devoted specifically to matters logical. In particular, treatments of delicate theological questions, for instance, in the *Commentaries* on Peter Lombard's *Sentences* (that is, the obligatory introductory compendium to the study of theology), often contain material that is highly illuminating from a logical point of view. The vexing questions concerning the nature of the Trinity and the interrelations of Its Persons illustrate this sufficiently. Two other topics that stand out in this respect are the question whether God's existence can be demonstrated and the treatments of the various Names of God. Thomas Aquinas does not enjoy a high reputation as a logician; his fame rests on his contribution to metaphysics and the philosophy of mind. Nevertheless, his *Summa Theologica* contains much that is of great relevance for contemporary philosophy of logic and language. Thus, for instance, in his discussion of the Names of God in Question 13 Aquinas anticipates Frege's ideas concerning names with different modes of presentation of the same object.

Furthermore, concerning the demonstrability of God's existence we read:

> A proposition is *per se nota* because the predicate is included in the nature of the subject: for instance, *Man is (an) animal*, for *animal* is contained in the nature of *man*. (*Summa Theologica*, I.ii.)

This passage ought to yield a *déjà lu* experience. Most of us, certainly, will have read this explanation of a proposition *per se nota*. The German text from which we know it is not

medieval, but was published 500 years later, in 1781, by a professor of philosophy at Königsberg in Eastern Prussia. There, though, the same formulation is used to explain the notion of an *analytic judgment*.

A Timeline of Medieval Logicians

Before XI
Porphyry (232–305)
Augustinus (354–430)
Boethius (480–524)

XI
Abbo of Fleury
Garlandus Compotista
Anselm of Canterbury (d.1109)

XII
Peter Abailard, 1079–1142
Adam Parvipontanus
Gilbert of Poitiers, 1080–1154
Alberic van Reims
John of Salisbury, c. 1120–1180

XIII
Peter of Spain (d.1277)
William of Sherwood (1210?–66/70)
Robert Kilwardby (d. 1279)
Albert the Great (1200–80)
Roger Bacon (1215–94)

XIII (*cont.*)
Boethius of Dacia (c. 1270)
Henry of Ghent (c. 1217–93)
Ralph Brito (c. 1290–1330)
Siger of Kortrijk (d. 1341)
Simon of Faversham (c. 1300)
John Duns Scotus (1265–1308/9)

XIV
Walter Burleigh (c.1275–1344/5)
William of Ockham (1285–1347)
Robert Holkot (c.1290–1349)
William of Heytesbury (d.1272/3)
Gregory of Rimini (c.1300–1358)
John Buridan (c.1300–after 1358)
Nicholas of Autrecourt (c.1300–after 1358)
Richard Billingham, (c.1350–60)
Albert of Saxony (1316–1390)
Marsilius of Inghen (c.1340–1396)
Vincent Ferrer (c.1350–1420)
Peter of Ailly (1350–1420/1)
Paul of Venice (1369–1429)
Paul of Pergola (1380–1455)
Peter of Mantua (d. 1400)

A Guide to the Literature

The Aristotelian *Organon* is, of course, a prerequisite for medieval logic. G. Patzig, *Aristotle's Theory of the Syllogism* (First German edn 1959) English translation by J. Barnes (Reidel: Dordrecht, 1969) is still the classical treatment of Aristotle's theory, and Paul Thom, *The Syllogism* (Munich: Philosophia Verlag, 1981) offers a most thorough modern presentation. A. N. Prior's lemma "Logic, Traditional" in: Paul Edwards (ed.), *Encyclopaedia of Philosophy* (New York: Macmillan, 1967) gives a compact, yet lucid overview. H. W. Joseph and R. D. McKirahan, *Principles and Proofs* (Princeton University Press, 1992) treats of Aristotelian demonstrative science, a topic of paramount importance for medieval logic. Valuable surveys of medieval logic can be found in the general histories by W. Kneale and M. Kneale, *The Development of Logic* (Oxford: Clarendon, 1962) and I. M. Bochenski, *Formale Logik*, English tr. by Ivo Thomas: *A*

History of Formal Logic (Notre Dame University Press, 1963). Surveys of medieval logic have been offered by E. A. Moody, *Truth and Consequence in Medieval Logic* (Amsterdam: North-Holland, 1953), Norman Kretzmann, "Semantics, History of" in: Paul Edwards (ed.), *Encyclopaedia of Philosophy* (New York: Macmillan, 1967), Jan Pinborg, *Logik and Semantik im Mittelalter* (Stuttgart-Bad Cannstatt: Fromann-Holzboog, 1972). Of these we have found the trenchant studies of Pinborg and Kretzmann especially useful. Moody draws liberally upon the notations and conceptual resources of modern (Frege–Russellian) predicate logic for his exposition of medieval notions, but the extent of his success in doing so is doubtful, owing to the differences in the forms of judgments used: medieval logic used the form of judgment (S is P) whereas (post-)Fregean logic uses the form of judgment (the judgable content A is true). It is still very much an open question how best to utilize the insights and achievements of modern metamathematical logic (which builds on Fregean logic) for the study of medieval logic in a non-anachronistic way. The systems of Lesniewski are based on traditional rather than Fregean logic, and might work much better here. A standard reference is D. P. Henry's lucid *Medieval Logic and Metaphysics* (London: Hutchinson, 1972) that also serves as an admirable introduction to Lesniewski.

The German *Historisches Wörterbuch der Philosophie* gives an incomparable survey of medieval logic. Individual, detailed lemmas, for instance, those on "Prädikation" and "Logik" have been of great help to us. This dictionary is also an invaluable guide, not just to medieval logic, but to the entire conceptual development of logic.

The Cambridge History of Later Medieval Philosophy, eds. N. Kretzmann, J. Pinborg, and A. Kenny (Cambridge University Press, 1982) is a universal compendium of medieval logic, with a companion volume of original texts *The Cambridge Translations of Medieval Philosophical Texts*: vol. I, *Logic and the Philosophy of Language*, eds. N. Kretzmann and E. Stumpf (Cambridge University Press, 1988). The equally monumental *Logica Modernorum*, vol. II (two parts), (Assen: Van Gorcum, 1967) by L. M. de Rijk, contains the original sources for the theory of supposition and other basic properties of terms.

Among original works we have found the William of Sherwood's thirteenth-century textbook *Introduction to Logic* (English translation by Norman Kretzmann), (Minneapolis: University of Minnesota Press, 1966) a useful general introduction to most issues covered in the present chapter. A later treatment, by almost a century and a half (±1400), of roughly the same material is offered by Paul of Venice in the *Logica Parva* (ed. and tr. by A. Perreiah), Philosophia Verlag (Washington: Catholic University of America Press, 1984). The British Academy supports a multi-volume edition/translation of the magisterial *Logica Magna* by the same Paul of Venice. William of Ockham's *Summa Logicae* has been partly rendered into English: part I (tr. M. Loux) and part II (tr. A. Freddoso and H. Schurmann) (Notre Dame University Press, 1974, 1980). Furthermore, the series *Philosophisches Bibliothek*, published by Felix Meiner Verlag, (Hamburg, contains many bilingual (Latin/German) editions, with introductions and careful annotations, of important works in medieval logic.

The Routledge series *Topics in Medieval Philosophy* contains volumes of interest for the general philosopher: Ivan Boh, *Epistemic Logic in the Later Middle Ages* (London, 1993) is particularly interesting on the epistemological aspects of the theory of consequences, while A. Kenny, *Aquinas on Mind* (London, 1993) spells out interesting par-

allels between medieval conceptions and those of Wittgenstein. Simo Knuuttila, *Modalities in Medieval Philosophy* (London, 1993) contains much that is of interest for the modern theory of modality, as does John Duns Scotus, *Contingency and Freedom: Lectura I 39* (ed. and tr. by A. Vos Jaczn. et al.), *New Synthese Historical Library*, vol. 42 (Dordrecht: Kluwer, 1994). Mikko Yrjönsauuri's Helsinki dissertation *Obligationes – 14th Century Logic of Disputational Duties*, in: *Acta Philosopphica Fennica*, 55 (1994), summarizes much of what is known about the theory of obligations. G. E. Hughes, *John Buridan on Self-Reference* (Cambridge University Press, 1982) is a perfect example of a medieval treatment of logical paradoxes.

There are two (English language) journals devoted to medieval philosophy, namely *Vivarium* and *Medieval Philosophy and Theology*. Of these, the first has a long tradition of articles within medieval logic and semantics. The *History and Philosophy of Logic*, *The Journal of Philosophical Logic*, and *The Notre Dame Journal of Formal Logic* also publish articles on medieval logic.