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Formal Approaches and Natural Language in Medieval logic

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Titles & abstracts

E. Jennifer Ashworth

How Natural is Natural Language? Some Post-medieval Discussions

I intend to discuss two questions. First, what were post-medieval logicians talking about when they contrasted natural signification with *ad placitum* signification? Second, what bearing, if any, do their accounts of how ordinary languages originate have on the question of whether they could knowingly aspire to setting up a fully regimented ordinary language, let alone a formal system? I shall contrast some early sixteenth-century Parisian logicians with three later Jesuit logicians, but I shall argue that in neither case did they leave much room for the deliberate construction of formalized languages.

Allan Bäck

Aristotelian Protocol Languages

Plato urges us to speak so as to chop reality up at the joints. Along these lines, Aristotle himself develops an ideal, protocol language, mostly on an *ad hoc* basis. He invents terms for virtues and vices when Greek does not have them; he legislates away certain ways of talking in his doctrines of paronymy and unnatural predication; he uses some very unusual syntactic structures in presenting his logical analysis of the statement. The medievals continued the project: in the Latin West, consider those like Anselm, in his *De Grammatico*. But especially in Islamic cultures, on account of the difficulty of translation of Greek into Arabic, the process of developing a protocol language was more systematic, deliberate, and extensively discussed.

Joël Biard

Jean Buridan : une philosophie du langage ordinaire ?

Dans ses usages de la notion d'imposition comme base de la signification conventionnelle, Jean Buridan relativise la figure du premier instituteur des noms au bénéfice (1) d'une structure de dialogue qui tout à la fois insiste sur la liberté du locuteur et accorde une place irréductible au destinataire ; (2) du consensus au sein d'une communauté, soit dans un cadre restreint ou temporaire, soit dans le cadre d'une langue donnée. L'institution première que l'usage reprend et modifie est présentée comme une convention communément admise, plus que comme l'acte mythique d'instauration d'un langage universel. Buridan ancre ainsi, du moins en principe, l'objet de ses analyses dans un langage pluriel, même s'il s'agit pour lui d'en exhiber la structure conceptuelle latente.

Harald Berger

"Sortes differt ab omni homine": A Tension in Albert of Saxony's Concept of Merely Confused Supposition

In his *Logica*, ch. II.3, Albert of Saxony rejects the view that merely confused supposition is to be defined in terms of a "descent" which is either "disiunctim" or "copulativim", i. e. to a sentence with a disjunct or a conjunct term (as opposed to a disjunction or a conjunction of sentences). The rejected view is to be found, e. g., in Thomas Maulfelt. In his *Sophismata*, however, before Soph. II.98, print Paris 1502, repr. 1975, fol. 13ra-b, Albert does not reject, but defend this very same view. Now, since these works are without any doubt authentic, Albert apparently has changed his mind on this point. But why and in what direction did this change of mind happen? This point will be discussed with a view to other contemporary authors and, e.g., to ms. Berlin, SB-PK, Ms. lat. fol. 206, fol. 294va-295va and 318vb-320vb.

Julie Brumberg-Chaumont

Forme et matière dans l'analyse des raisonnements sophistiques

Nous proposons d'observer la manière dont la tradition latine des Réfutations sophistiques a pu mettre en oeuvre de manière opératoire, dans l'analyse des 13 fallacies, la superposition, issue de la tradition grecque, entre, d'une part, les raisonnements matériellement éristiques et les raisonnements formellement éristiques, et, d'autre part, les raisonnements qui partent de prémisses fautives mais sont de véritables syllogismes et ceux qui ne sont des syllogismes qu'en apparence. Cette enquête permet de tenter de comprendre à la fois ce que peut être une "matière" en logique (matière des propositions ; matières du syllogisme), et quelle sont les relations complexes qui se tissent chez les auteurs du XIIIe siècle entre les notions de

forme et d'inférence dans la définition du syllogisme, ou, plus précisément entre forme syllogistique, figures et modes, et nécessité de l'inférence, relation qui varie considérablement d'un logicien à l'autre

Catarina Dutilh Novaes

The form of a syllogism: figure or mood?

As far as we know, the distinction between the form and the matter of arguments (syllogisms in particular) was formulated for the first time within the tradition of the ancient commentators; the oldest still extant formulation of this distinction is to be found in Alexander of Aphrodisias' commentary on the *Prior Analytics*. It constituted a crucial addition to the stock of Aristotelian logical doctrines, and was to have long-lasting impact. Our own modern conception of the *logical form* of an argument, which is essentially understood in terms of *schemata* (i.e. the skeleton of an argument once its non-logical terms are removed, and on which suitable substitutions can be carried out), is ultimately to be traced back to the ancient commentators. However, a few important transformations occurred along the way. Most texts in the tradition of the ancient commentators identify the form of a syllogism as corresponding to its *figure*; a syllogistic figure, however, is not a schema in the modern sense -- but a syllogistic *mood* is. In my talk, I retrace the main steps of these developments from the 12th to the 14th century, which consist in particular in the change from a syllogistic figure to a syllogistic mood being attributed the status of the form of a syllogism. These steps can be identified in four significant texts: *Anonymus Aurelianus III*, *Dialectica Monacensis*, Kilwardby's commentary on the *Prior Analytics*, and Buridan's treatise on consequence. Indeed, Buridan explicitly says that the form of a consequence/argument pertains to its syncategorematic terms, while its matter pertains to its categorematic terms; for a syllogism particular, this entails that its mood, rather than its figure, correspond to its form. So in a sense, the schematic notion of the formal is already fully mature in this text. However, in the sections of the treatise dedicated to syllogisms, Buridan still systematically resorts to the *figures* of syllogisms in order to present his theorems and conclusions. I discuss some of Buridan's arguments, which illustrate the fruitfulness of the concept of a syllogistic figure for logical theorizing.

Sten Ebbesen

Habitudines locales and Logic as a Formal Discipline

Boethius of Dacia takes *habitudines locales* to be the sort of thing a dialectician knows about, and he can flesh out such *habitudines* in logical rules, but qua dialectician he cannot judge an argument such as 'this is cold, therefore it is not hot' in which a rule about contrariety has been instantiated, because once 'contraries' has been replaced with 'hot' and 'cold' we are in

the realm of a real science, in this case physics. The paper will examine the origin and fate of this view.

Leone Gazziero

Utrum figura dictionis sit fallacia in dictione. Et quod non videtur. *How Medieval Logicians Came to Account for an Odd Question by an Impossible Answer*

One of the singularities of Latin exegesis of Aristotle's *Sophistici elenchi*, is that it arbitrarily brought together two families of fallacies, the « figure of speech » and the « accident », despite the fact that they are on either side of the divide between sophisms related to expression and sophisms independent of expression, a divide that lays at the heart of Aristotle's taxonomy of sophistic arguments. What is behind this surprising identification ? The talk is meant to show that it actually originates from a curious mistake in Boethius' translation of Aristotle's *Sophistici elenchi*, 22, 178b 36-37 which radically transformed the nature of the argument at stake. While it was originally an example of the fallacies related to the « figure of speech », Boethius' translation wrongly brings about two arguments instead of one, both related to the « accident ». This explains why authors from the Latin tradition came to think that fallacies of « figure of speech » were linked to fallacies of « accident » closely enough to ask whether they actually fell outside expression, even though it does not at first glance appear that such a possibility was allowed or even suggested by Aristotle's text. This odd question illustrates some of the remarkable features of the medieval archive and how some of its most peculiar problems came to be. It specifically allows us to reconstruct the mechanisms through which a minor disturbance in the letter of the text leads to a whole new way of organising its exegetical material.

Yukio Iwakuma

On medium, a Type of Argumentation in the Early 12th Century

The two Introductiones, which I edited in CIMAGL 63 (1993), have treatises on *media* as attachments. 'Medium' is a term for a special type of *consequentia* (if-clauses), used only in the early twelfth century. I have discovered several texts concerning the issue. In my paper I shall show how the controversy on the *media* was proceeded and ceased in the early 12th century.

In my paper, I shall refer to several texts which are too long to incorporate into my paper. You can see the full-transcription of them in:

<http://www.unige.ch/lettres/philo/sophismata/ESMLS/Iwakuma/>

Raina Kirchoff & Cristoph Kann

Formal Elements in Natural Language - Sherwood's Syncategoremata revisited

The main contribution of the Middle Ages to the formal analysis of natural language consists in the treatment of syncategorematic terms, which is of particular relevance for historians of logic as well as for linguistics. In the 13th century, treatises on syncategoremata constituted a special literary genus of advanced logic, dedicated to the odd semantics and subtle functions of logical operators and other logically relevant words. The *Syncategoremata* of William of Sherwood, one of the most important authors within this tradition, were edited by J.R. O'Donnell in 1941, a translation with a critical commentary by N. Kretzmann followed in 1968. Since research on medieval logic has made significant progress during the last decades and since the above-mentioned edition, translation and commentary of Sherwood's *Syncategoremata* reveal significant errors, we have published a new critical text, a revised commentary and the first translation of a treatise of syncategoremata into German. The project has just been completed, and we would like to present some of our results.

Simo Knuuttila

Duns Scotus on the Propositionality of Infinite Knowledge

I shall discuss Scotus's various conceptions of the omniscience of Christ and how he explains the actual infinity of the content of this knowledge from the point of view propositional language.

Chris Martin

Abaelard on the Demarcation of Logic

An examination of Abaelard's conception of logic and in particular the distinction between those logical consequences which he classifies as perfect in virtue of their holding for all uniform substitution of terms and those which are imperfect because they hold only for substitutions for certain classes of terms. Of particular concern will be the status of the propositional constants and the question of whether the principles of inference which govern them should be classified as perfect or imperfect.

John MacFarlane

The Origins of Logical Hylomorphism

Fourteenth-century logicians define formal consequences as consequences that remain valid under uniform substitutions of categorematic terms, but they say little about the significance of this distinction. Why does it matter whether a consequence is formal or material? One

possible answer is that, whereas the validity of a material consequence depends on both its structure and "the nature of things," the validity of a formal consequence depends on its structure alone. But this claim does not follow from the definition of formal consequence by itself, and the fourteenth-century logicians do not give an argument for it. For that we must turn to Abelard, who argues explicitly that consequences that hold under uniform substitutions of their terms take their validity from their construction alone, and not from "the nature of things." I will look at Abelard's argument in its historical context. If my reconstruction is correct, the argument, and hence also the significance of the distinction between formal and material consequence, depends on a conception of "the nature of things" that we can no longer accept. This should give pause to contemporary thinkers who look to medieval notions of formal consequence as antecedents of their own.

Ana Maria Morà-Marquez

13th Century Masters of Arts on Equivocation

The aim of this paper is to show the different ways in which scholars from the 13th century deal with Aristotle's notion of homonymy. First, I shall introduce the medieval definitions of fallacy and equivocation; second, I shall present the typology of equivocation adopted by all these scholars; then I shall present the different formal approaches to two problems related to this typology, problems which directly concern the question of resolution of equivocation. I shall conclude by showing that towards the end of the century a group of scholars presents us with a conversational approach to this question that breaks with the traditional formal approach and I shall claim that this approach is more faithful to the linguistic ideas that Aristotle puts forth in the *Sophistical Refutations*.

Claude Panaccio

Ockham on Synonymy and Mental Language

The primary object of logic for William of Ockham is mental, rather than spoken or written, language. In recent literature, this has prompted the question whether Ockham's mental language is anything like a logically ideal language in the modern sense. Much of the discussion has centered on whether all simple connotative terms are logically eliminable from Ockham's mental language, and this in turn has prompted a debate as to whether simple connotative terms are in general synonymous with their nominal definitions for the *Venerabilis Inceptor*. I have held in various places that they are not, but Fabrizio Amerini has recently argued in some details that a connotative term is semantically (if not epistemically) synonymous with its definition in Ockham's view. The present paper will review Amerini's textual arguments for this.

Terence Parsons

There is no fundamental difference between medieval logic and contemporary (philosophical) logic

Medieval logicians make disparate claims about logical principles under many different headings. I argue that, like contemporary symbolic logic, the central claims cohere with one another, and there is a core of principles from which they all can be formally derived. The resulting system of logic is comparable to the first-order predicate calculus. Medieval modal logic and tense logic extend the medieval system, just as do modern modal and tense logics, though the details are importantly different. I will speculate how either system relates to what some linguists have called “natural logic”, whose sentences have a deep structure syntax.

Paloma Pérez-Ilzarbe

Aristotelian syllogistic meets terminist logic: on the formality of the expository syllogism

This paper explores a particular aspect of the encounter between two different logical traditions: Aristotelian and terminist logic. The semantic notions introduced by medieval terminist logicians as tools for the analysis of language provide a singular way of justifying the Aristotelian results. These semantic tools have proven to be so fruitful as to allow the extension of Aristotelian analyses far beyond the four basic propositional forms. The theory of the expository syllogism is an example of such an extension: to the analysis of propositions with singular terms. But the new tools have also their own peculiar limits. One of them concerns the terminist efforts to safeguard the formality of syllogistic consequence. I will consider in particular the threat that Trinitarian singular terms pose to the formality of expository syllogisms. I will assess the semantic analysis involved in Wodeham’s popular solution to this threat, from the perspective offered by some post-medieval logicians (Jeronimus Pardus, Jodocus Truttvetter), who are no longer concerned about the theological aspects of this threat but who are guided by purely logical considerations.

Ernesto Perini-Santos

The underdetermination of the structure of mental language in Ockham and Buridan

The central theoretical role of mental language (ML) is to explain the aboutness of conventional languages (CL). While the direction of explanation goes from ML to CL, we recognize the structure and the elements of the ML arguing from CL: (T₁) A feature *e* of a CL Pertains to ML iff two sentences differing only in *e* have different truth-conditions.

As it is well known, (T₁) does not fully determine the structure of the ML. One effort to get a more articulate ML is to associate it to “the most fully articulated spoken or written language.” [Adams (1987): 292] It is not easy, however, to understand how ML can be more or less explicit. On the other hand, it has an explanatory role that may lead to a more

demanding view of its structure. This is particularly the case if we associate it with deep structure. According to this view, “expounding or exposing a spoken or written sentence is just finding a second equivalent complex spoken or written sentence whose structure mirrors that of the mental sentence to which the first is subordinated.” [Normore (1985): 192] There are many texts in which Ockham analyses structurally ambiguous sentences, but he doesn’t say that they correspond to distinct mental sentences, as we might expect if Normore’s claim was right.

A more articulate view of the ML can be found in Buridan: every mental sentence has a layered structure, for its unity results from the action of the copula as a second operation of the intellect. While this sort of noetic argument will result in a more structured view of the ML and can be extended beyond the copula, it doesn’t give a different mental structure to every semantic distinction.

Shahid Rahman

Ibn Sina on Explicit Quantification

See at <http://www.unige.ch/lettres/philo/sophismata/ESMLS/images/rahman.pdf>

Stephen Read

Non-normal Propositions in Buridan’s Logic

John Buridan’s introduction of the notion of non-normal propositions (*propositiones de modo loquendi inconsueti*) in his theory of the syllogism is a marked example of the influence of vernacular languages on the use of Latin in medieval logic and the regimentation of the language used. Classical Latin is an SOV language, in which the word order of the simplest sentence form is subject-object-verb, in contrast to the SVO order of the vernacular languages of the later Middle Ages. Buridan’s so-called non-normal propositions arise from deeming the normal order to be the SVO of the vernacular, and so taking SOV, where the object-term precedes the verb, to be non-normal. In particular, introducing O-propositions of non-normal form permits conversion of normal O-propositions, meaning that all four propositions of the traditional square of opposition can be converted, thereby adding further possibilities to the theory of the assertoric syllogism.

Irène Rosier-Catach

“Logique et théologie à Port Royal: le sens ‘ordinaire’ et ‘catholique’ de ‘hoc est corpus meum’”

[Abstract will follow]

Luca Sbordone

Semantics and Pragmatics of Reference. Elements of a contemporary theory of Supposition.

In my presentation, I will support the analogy between Ockham's theory of suppositions and a contemporary semantico-pragmatic paradigm known as Default Semantics. I will then present the interpretation of Ockham's supposition theory developed by Catherina Dutilh Novaes, according to which Ockham's doctrine is regarded as a theory of propositional meaning aimed at generating multiple readings of referentially ambiguous sentences, rather than being close to a modern theory of reference.

I argue that in contemporary semantics an analogous problem of referential ambiguity is posed by Donnellan's distinction between referential and attributive uses of definite descriptions. I will show extant treatments of such distinctions, both from the semantic and the pragmatics sides, and finally turn to the treatment of this phenomenon within the paradigm of Default Semantics. It will become clear that such an approach comes in many respects incredibly close to Ockham's machinery of supposition theory.

My aim is to show how such a strict comparison can shed light on a rather general question concerning what medieval theories of supposition were supposed to accomplish.

Joke Spruyt

John Wyclif on the Formal Nature of Inference

In this contribution I will look into the idea of 'formalness' as found in the Logic of John Wyclif. It is remarkable that Wyclif wants nothing to do with the so-called 'consequentia materialis'. Considering his adamant rejection of this particular, quite commonly accepted type of inference, we need to understand what exactly his own conception of formality comes down to. I hope to show that Wyclif's notion of inferentiality hinges on two separate foundations of logic: while his account of conditional and inferential expressions is expressed in terms of the logical truth-conditions of an inference, ultimately his analysis of the formalness or validity of inferences is based upon an ontological starting point, i.e. the ontology of the proposition(s) involved.

Ricardo Strobino

Formaliter sequi. A discussion of logical consequence in the late XIVth century

The aim of my talk is to discuss the notion of a logical consequence, i.e. what it means for something to follow - in particular to follow "formally" - from something else, within the context of the late XIVth century debate on consequentiae.

I shall briefly outline the earlier background and then focus on the theory developed by the Italian logician Peter of Mantua's (d. 1399) in connection with some of his contemporaries. I shall discuss the relationship between an account of logical consequence based on the notion

of inseparability (a consequence is good whenever the antecedent and the negation of the consequent are incompatible) and one based on the notion of containment of meaning (a consequence is good whenever the meaning of the consequent is understood, or contained, in that of the antecedent). In doing so, I will also try to flesh out Peter's suggestion that "formality" has a *latitudo*, i.e. comes in degrees.

Paul Thom

Reduction to syllogistic form

Chapters 32-44 of the *Prior Analytics* applies various techniques of analysis for formalising pre-formal argumentation. Robert Kilwardby interprets these chapters as illustrating a process of reduction whereby what is yet-to-be-syllogized gets syllogized. This process is sometimes further specified as a transition from potentiality to actuality, and sometimes as a process of correction. Kilwardby's interpretation proceeds by identifying difficulties, their causes, and rules for their solution. The difficulties are usually described in grammatical terms, whereas the solution are formulated as logical rules taken from Aristotle or the *Logica Modernorum*. Kilwardby's approach to this complex of texts and problems will be contrasted with the approaches of selected later writers, including Ockham and Leibniz.

Sara Uckelman

More Than Formality: The role of dialectical contexts in Medieval Logic

The formal aspects of Latin as it was used by the medieval logicians has been sufficiently remarked upon in the past, and this formal or regimented nature has provided a basis upon which modern logicians can find common ground with medieval logic. However, to focus on this the formality of the language used in medieval logic to the exclusion of other features is to misrepresent some properties of central importance. In this paper we look at how dialectical context, in addition to formality, affects the validity and invalidity of inferences. As two examples we cite epistemic logic as found in (a) Paul of Venice and (b) inferences in obligationes. (a) Many of Paul's inferences crucially rely on the dialogical nature of his presentation of a proof to the reader, and on the basis of this attributing knowledge to the reader; such inferences cannot be rendered in a monological setting and maintain formal validity. (b) In obligationes, as is well known, the Respondent may concede, deny, or doubt the propositions that are put forward by the Opponent. Some recent scholars have tried to interpret these three ways of responding as three different truth values; this analysis overlooks the fact that the response occur in a dialectical setting, and that because the Respondent may be forced to deny what is true, to concede what is false, and to doubt what is known, these actions should not be taken as ascribing truth values to propositions.

Mikko Yrjönsuuri

"Consequentia formaliter formalis in Paul of Venice and other kinds of formal validity"

Calling an inference "formally valid" in contrast to merely "valid" had several meanings in medieval logic. The main opposition is between Jean Buridan and practically all other logicians. While Buridan discusses something very similar to the substitution principle that was very prominent in twentieth century logic, other logicians (eg. Burley, Ockham) define formal validity otherwise. The paper concentrates on Paul of Venice's discussion of the matter in his *Logical magna*. This discussion is the most fruitful from the logical point of view, because it is clearly based on a thorough understanding of the different sides of the dispute.