Articulating Medieval Logic, by Terence Parsons. Oxford: Oxford University Press, 2014. Pp. xiii + 331. H/b £50.00.

This is a very exciting book that makes some bold claims about the power of medieval logic. But it is self-confessedly not an introduction to medieval logic (p. 5). Rather, it represents the animadversions of a twentieth- (or even twenty-first)-century philosopher of logic and linguistics suddenly finding himself working within the framework of fourteenth-century logic (rather as Mark Twain's Connecticut Yankee found himself at the court of King Arthur—cf. p. 4).

Nonetheless, the book seems to have had its origins as such an introduction to the logic of medieval times. This is most apparent in the exercises (labelled 'Applications') that punctuate the text every few pages. They are in fact surprisingly useful in testing for him or herself the reader's comprehension. Unfortunately, there are no worked solutions in the book, and so no assistance for the reader as Parsons' formal system becomes more and more complex chapter by chapter. Readers may, therefore, wish to consult

https://sites.google.com/site/tparsons5555/home/articulating-medieval-logic,

where the author gives solutions to many of the exercises, lists errata and summarises the formation rules and rules of inference.

The idea for articulating medieval logic is this: the medievals, following Aristotle's lead, did not formalize their logic, but regimented natural language. For example, Aristotle forced propositions into the straitjacket of the A, E, I and O forms: '*P* belongs to every, no, some, or not every *S*'. Syllogistic validity is formal in the

sense that it must hold whatever terms replace the schematic letters in the three two-premise schemata distinguished by the position of the middle term that connects the premises. Parsons opens his book by rehearsing Aristotelian logic as seen by the medievals. But the medievals went far beyond Aristotle. Indeed, Parsons claims (ch. 9) that the whole of first-order predicate logic can be represented in medieval logic, and concludes that chapter by attempting to express Peano's postulates for arithmetic in his regimented notation.

Parsons dubs his regimented language 'Linguish', a system of logical forms based on medieval Latin. As such, Linguish inherits the grammar of Latin married strictly speaking to the vocabulary of Latin too, but expressed 'using English vocabulary, … for the convenience of English readers' (p. 84). Latin is at root an SOV-language, that is, the word order of the simplest sentences places the verb at the end (subject-object-verb), and so does Linguish. In its simplest form, introduced in ch. 4, the only verb is the copula, 'is'. The syntax and vocabulary of Linguish are steadily expanded through the book, so that by the end one has a system of grammatical construction and derivational licence which merits the epithet 'baroque'. One unfortunate (but understandable) omission is a summary, perhaps at the end of the book, of the full system of rules of both grammar and derivation. As it is, one must try to trace the successive extensions of the initial formulation in ch. 4 made in subsequent chapters. But such a summary would be contrary to the spirit of the book and intention of the author. The book does not claim to have exhausted the possibilities for extension and expressive power. Indeed, the proof of completeness (that is, of capturing modern logic within Parsons' 'medieval'

system) is followed by further complications concerning tense and modality in a final chapter 10.

The most notable difference between Linguish and modern logic is that it has no variables. Variables in modern logic serve, among other things, to connect different syntactic positions in a formula, the subject of one predicate with the object of another and a quantifier which binds both. The latter function is provided by grammatical markers in Linguish, the former by the theory of anaphora. In the markers, Parsons takes the notion of 'theta-role' from Cartesian linguistics, whereby each verb requires further syntactic elements to perform certain thematic roles, e.g., those of agent, patient or goal. In Linguish, logical forms are generated successively by rules which prepose denoting phrases ('Socrates', 'every man', 'some horse'), each with its own marker, and the particle 'not', to a verb, thereby closing the unbound markers attached to the verb. No two denoting phrases may share a marker, nor may verbs share markers. Consequently, there is a one-one relation between each denoting phrase (singular term or quantified expression) and each theta-role assigned to a verb. Linguish is basically a term logic; conjunctions, disjunctions and conditionals come later.

Once a logical form has been generated, further rules interpret it by converting it to a 'surface' form which bears some resemblance to a regimented sentence of English. Other rules yield the truth-conditions of the logical form, and yet others give an account of deducibility between logical forms. Parsons gives a Henkin-style completeness proof for the basic system presented in ch. 4.

But that system is far from complete, for as noted, an essential aspect of modern logic, and of natural language, is missing, anaphoric reference—what the medievals called the theory of relative terms. Without a theory of anaphora, Parsons conjectures (p. 261), his theory is decidable; with it, he shows (pp. 265 ff.), it can capture the standard example of a serial irreflexive transitive relation, whose domain must be infinite. The simplest, naïve account of relatives is that they can be replaced by their antecedents. But this is true only of singular terms, Parsons claims (p. 228; cf. p. 239 n.). To extend the account to general (or common) terms, one needs some account of their semantics, and that was given in medieval logic by their distinctive, and idiosyncratic, account of what they called the supposition of terms. For discrete (i.e., singular) terms, this is similar to reference; for common terms, it is an account of quantification. Parsons is unduly modest in mentioning only briefly (§ 7.12, pp. 223-6) what is arguably his most significant contribution (before the present volume) to our understanding of medieval logic, the notion of 'global quantificational import'. A common term in its normal use not only supposits for certain objects, it supposits for them in a certain way—these are the so-called 'modes of common (personal) supposition': these modes are _determinate_ (wide-scope existential quantificational import in Parsons' terms); (confused and) _distributive_ (universal quantificational import); and (merely) _confused_ (narrow-scope existential import). Through the notion of quantificational import, Parsons is able to explain a long-standing puzzle about the mode of supposition of the predicates of O-propositions relative to E-propositions (of the form 'Not every _S_ is _P_' and 'No _S_ is _P_', respectively). The medievals claimed, to a

man, that '*P*' has distributive supposition in both. But whereas 'No <u>S</u> is <u>P</u>' is equivalent to a conjunction of propositions of the form 'No <u>S</u> is this <u>P</u>', 'Not every <u>S</u> is <u>P</u>' is not equivalent to any such conjunction. But it does entail such a conjunction, for whereas '*P*' in 'No <u>S</u> is <u>P</u>' has wide-scope universal import, in 'Not every <u>S</u> is <u>P</u>' it has narrow-scope universal import. By distinguishing wide- from narrow-scope universal import, Parsons is able to restore symmetry to the application of the modes to the four corners of the traditional square of opposition.

To return to relatives: although relatives with quantified antecedent cannot be replaced by their antecedents (while preserving sense and truth), their mode of supposition is determined by them. The theory is similar to that of so-called 'E-type pronouns' in contemporary philosophy of language: to capture their mode of supposition, we replace the pronoun with a restrictive relative clause. Example: 'A man coughed. He was ill.' We cannot replace 'he' with 'a man' on pain of changing the meaning, but we can explain its supposition by replacing it with 'the man who coughed'. The supposition of the pronoun is the same as that of its antecedent, but 'singled' for its antecedent. Parsons follows Hülsen in generalizing the notion of 'singulation' which they find in the medievals to explain the E-type pronoun.

One of the most significant achievements of the medievals was their account of the logic of so-called 'oblique' terms. Although the theory was not fully worked out by them, it certainly answers and silences De Morgan's famous criticism of traditional logic, that it could not account for inferences involving such terms. But traditional logic of his time was a poor echo of the theory developed in the heyday of medieval logic, the fourteenth century. Parsons shows (p. 163) how to derive

'Every horse's head is an animal's head' from 'Every horse is an animal'. The genitives here are an example of oblique terms—as also are 'accusatives' such as the direct objects of transitive verbs. In Linguish, they create what Parsons calls 'parasitic terms' (p. 130—note that 'variable' in the definition on that page, and elsewhere, e.g., p. 157, is a typo for 'marker'): a parasitic term is one that incorporates a (grammatical) marker. If Cicero sees a donkey, he is of-a-donkey$_{acc}$ a seeing thing; if he owns a donkey, he is a donkey-possessor and his donkeys are 'of-Cicero'. Theta-roles are here extended to track these connections.

Despite the apparent conclusiveness implied by Parsons' answer to De Morgan, by his completeness proof, and by his demonstration that modern logic can be represented in (his elaboration of) medieval logic, Parsons actually presents us with a programme—with a challenge, in fact. He has shown how to use insights from medieval logic to construct a regimented natural language that elucidates many of the logical features of our language which modern logic captures only by forcing it into an unnatural Procrustean form. The books lacks a conclusion because that task is not completed. Other features of natural language remain to be incorporated—tense for one. A start is made on this in the final chapter. But there is enough in this rich volume to inspire future researchers to adapt medieval insights to further aspects of the rich logic of natural language.

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