ANAPHORIC PRONOUNS IN

VERY LATE MEDIEVAL SUPPOSITION THEORY

This paper arose from an attempt to determine how the very late medieval[1] supposition theorists treated anaphoric pronouns, pronouns whose significance is derivative from their antecedents. Modern researches into pronouns were stimulated in part by the problem of "donkey sentences" discussed by Geach 1962 in a section explaining what is wrong with medieval supposition theory. So there is some interest in seeing exactly what the medieval account comes to, especially if it turns out, as I suspect, to work as well as contemporary ones. Besides, finding a good analysis of pronouns has proved to be very difficult, and so we might possibly find some insight in a historically different kind of approach.

I discuss a version of supposition theory that aims at producing *analyses* of sentences containing quantified terms,[2] as articulated around 1400 by Paul of Venice, and as further developed by certain logicians such as de Soto and Celaya in the 1400's and early 1500's.[3] Much of what I will say also applies indirectly to earlier versions of supposition theory (before 1400).

1 Modes of Supposition

Supposition theory proposes to analyze `Every A is B' as[4]

This A is B, and *that* A is B, and *that* A is B, and so on for all the A's,

and to analyze `Some A is B' as

This A is B, or *that* A is B, or *that* A is B, and so on for all the A's.

The term `A' in the former example is said to have *distributive* supposition, and the term in the latter has *determinate* supposition. A term with neither of these kinds of supposition has *merely confused* supposition.[5]

A term with *distributive* supposition is one that is part of an NP that has the logical force of a restricted universal quantifier whose scope is the whole sentence; the term itself supplies the restricting clause of the restrictive quantifier. An example is the term `donkey' in `Every donkey is an animal'. A term with *determinate* supposition is one that is part of an NP that has the logical force of a restricted existential quantifier whose scope is the whole sentence. An example is `donkey' in `Some donkey is an animal'. Terms with *merely confused* supposition are either not quantificational at all, or they have scope over something less than the whole sentence. An example is `animal' in `Every donkey is an animal'.

The notions of kinds of supposition can be used to identify what we now call scope ambiguities in sentences, and they can be used to analyze cases of multiple quantification. For example, the sentence

Some boy dates every girl.

is ambiguous. On the wide scope reading of `some boy', `boy' is said to have determinate supposition, and `girl' has merely confused supposition. The suppositional analysis of the sentence with respect to `some boy' is

This boy dates every girl ⎓ that boy dates every girl ⎓ ..., and so on for all the boys.

In the disjuncts of this analysis `girl' has changed supposition; it has distributive supposition (in each disjunct), and so it can be analyzed further, yielding

[this boy dates this girl & this boy dates that girl & ..., and so on for all the girls]

_

[that boy dates this girl & that boy dates that girl & ..., and so on for all the girls]

_

...., and so on for all the boys.

On the other reading, `every girl' has wide scope, and `boy' has merely confused supposition. On this reading, the expansion above is blocked. However, since `girl' has distributive supposition on this reading, we may do a similar analysis starting with it, and two expansions of the original sentence then lead to an analysis of the other reading:

[this boy dates this girl _ this boy dates that girl _ ..., and so on for all the boys]

&

[that boy dates this girl _ that boy dates that girl _ ..., and so on for all the boys]

&

...., and so on for all the girls.

2 Scope

I have talked in terms of wide and narrow scope, but Geach 1962 claims that supposition theory lacks the notion of scope, and for this reason is essentially inadequate. Whether that is true is complicated to assess. First, there is the question of what happens when you look at unanalyzed sentences of ordinary language. Here the question of scope is intertwined with how you tell what mode of supposition a term has. The official account is that either (i) this is a matter of the

will of the speaker, or (ii) the sentence is straightforwardly ambiguous. (I think it is fair to add an unspoken assumption that grammar constrains the options.) Neither of these claims mention scope, and in this sense Geach is right. But even in contemporary theory the notion of scope applies to theoretical analyses of sentences, not to the sentences themselves prior to analysis. And here the medieval theory contains something very close to the notion of scope. Theorists analyzed sentences by paraphrasing them using stilted variants of Latin in which the left-to-right order of terms patently corresponds to what we would call scope. For example, the sentence above would have been seen as having the two technical representations:

Some boy dates every girl (`Some boy' has widest scope.)

Every girl some boy dates (`Every girl' has widest scope.)

Rules were then given for determining what mode of supposition a term has based on how it is affected by quantifier words (and other words) to its left in the technical analysis. For example, a word like `every' is said to confer distributive supposition on the term it combines with (providing that this effect is not confounded by a word to its left), and it "confounds" the supposition of terms to its right. (So in the second example, `girl' has distributive supposition, and the supposition of `boy' is confounded *C* instead of having determinate supposition, as in the first sentence, it has merely confused supposition.) This surely looks like a codification of scope in terms of left-to-right ordering.

Negation has a similar effect; one can write

Not some boy dates every girl

Some boy not every girl dates

Some boy every girl not dates

and the negation has the effect of reversing the suppositions of terms to its right.[6] Of course, medieval formulations of grammar are a bit vague, and the rules never work quite right in all cases, but that doesn't belie the presence of a clear idea. What is missing is a general theory of scope to unify the various observations, a notion that would correspond to the idea that a sentence is constructed in a stepwise recursive fashion with scopes indicating the part-whole relation, and with a semantic theory fashioned to work on the steps. This grand theoretical synthesis was never accomplished. But many of the pieces are there, and it might be instructive for us to view the medieval accounts through these spectacles. Besides, although today we have the grand vision that they lacked, we are struggling to implement it, and we may learn things from what was accomplished by clever people engaged in a parallel pursuit.

3 Codifying the Analysis

I now want to turn to a formalization of part of supposition theory using modern apparatus, so that we might explore its semantic significance. We go a long way toward a modern understanding of these analyses merely by *abbreviating* them. For example, let me abbreviate the analysis of `Every donkey is grey':

This donkey is grey & that donkey is grey & ..., and so on for all the donkeys

by

(Every)[Donkey, that donkey is grey].

In this pattern, the `(Every)[___ , ...]' abbreviates the structure:

.... & .... & ..., and so on for all the ____'s,

the `Donkey' before the comma abbreviates what goes in the last blank (it tells us what is quantified over), and the `that donkey is grey' is what goes in the dotted blanks.

This abbreviation makes the analysis look a lot like the modern notation for restricted universal quantification, restricted to donkeys. This especially comes to mind because the medieval account is obviously intended to be read in a way that makes it equivalent to a restricted universal quantification over donkeys. The notation looks even more modern if we innovate a little bit in order to handle a certain way in which the medieval account fails to explicitly represent what is usually obvious from context. Suppose we wish to analyze the sentence

Every donkey kicks a donkey.

There are two terms to analyze, and if you do them both you end up with this:

[This donkey kicks this donkey _ this donkey kicks that donkey _ ..., and so on for all the donkeys]

&

[That donkey kicks this donkey _ that donkey kicks that donkey _ ..., and so on for all the donkeys]

&

[That donkey kicks this donkey _ that donkey kicks that donkey _ ..., and so on for all the donkeys]

&

..., and so on for all the donkeys.

There is an obvious notational problem here: the donkey terms are all mixed up. This is not crucial if you have an example like this only once per textbook, since it is obvious from context how to keep things straight, but for systematic theorizing we need some disambiguation. A simple way to keep things straight is to coindex the `*this*' terms with the `*and so on*' terms to tell which go with which, like this:

[This$_x$ donkey kicks this$_y$ donkey _ this$_x$ donkey kicks that$_y$ donkey _ ..., and so on for all$_y$ the donkeys]

&

[That$_x$ donkey kicks this$_y$ donkey _ that$_x$ donkey kicks that$_y$ donkey _ ..., and so on for all$_y$ the donkeys]

&

[That donkey$_x$ kicks this$_y$ donkey _ that donkey$_x$ kicks that$_y$ donkey _ ..., and so on for all$_y$ the donkeys]

&

..., and so on for all$_x$ the donkeys.

Coupling this with the abbreviation I introduced earlier, the analysis of `Every donkey is grey' is now

(Some x)[x is a donkey, this$_x$ donkey is grey].

This is the notation I will use. Keep in mind what I claim for it. I have introduced it only as a terminological abbreviation for the medieval analysis, with the one innovation that we have variables for disambiguating which *this's* go with which *and so on's*. So there is nothing here that is not in the medieval account, either explicitly in the medieval notation or implicit in context.

The notation I have chosen is heuristic, but I have said nothing about its semantics. Here we have two choices. One is to read the medieval analysis as originally worded, and take that to be an articulation of the semantical account of the abbreviation I have produced. Then, to find

out exactly what the medieval semantic account is, you have to study the medieval texts, and things are sometimes murky. I do not address that murkiness here. The other choice is to give my abbreviation the semantics of modern restricted quantification using assignments to variables. On this account, the notation:

(Some x)[x is A, this$_x$ is B].

is true iff there is at least one thing that satisfies both `x is A' and `this$_x$ is B'. The two sorts of analyses give you the same answers, though the way you go about getting the answers is different: the medieval account feigns demonstrations of existing donkeys, and conjoins or disjoins the results, whereas the modern account avoids feigning demonstrations and instead talks of satisfaction conditions. I remain neutral on exactly how the semantics should go because my goal here is to see how anaphoric pronouns work, and that can be discussed independently of a particular semantics.

4 Analyzing the Demonstrative Term

I have talked as if we have a modern interpretation of the proposed analyses, but we don't have that unless we have a modern analysis of the demonstrative phrase `that$_x$ donkey', and I haven't addressed this yet. What is needed for the modern reading is to construe `that$_x$ donkey' so that it means something like `the donkey that x is':

that$_x$ donkey $\Box$ the donkey that x is.

For the purpose of this investigation, I presuppose the crude but natural modern definition[7]

that$_x$ A $\Box$ (ιy)[y=x & y is (an) A].

With this in the background, I will continue to use the notation `that$_x$ A' for its naturalness.

Of course, any modern logician will wonder why we should bother to retain the complexity of the demonstrative construction here. Why not just replace `that$_x$ A' by `x' all by itself? If we do this, we end up with the claim that supposition theory is a theory of restricted quantification. That's fine, but it's a familiar point in the literature, and it is no innovation to repeat it. I want instead to explore the idea that something distinctive and valuable can be got from retaining the medieval use of the demonstrative: this, I claim, allows a natural and interesting alternative treatment of pronouns.

Besides, `that' is of interest in its own right. In modern English, the phrase `that donkey' occurs, and it can behave anaphorically, much like a simple pronoun. (We say, e.g., `If a donkey misbehaves, that donkey may be in for a beating'.) If we get an analysis of such phrases too, so much the better.[8] I think that everything I say applies to these anaphoric phrases as well as to pronouns, so there is no obvious motivation to avoid them.

Recapitulating: The two analyses of `Every donkey is grey' to be compared are the modern one:

(Every x)[x is a donkey, x is grey],

and the medieval one:

(Every x)[x is a donkey, that$_x$ donkey is grey].

5 Antecedent Migration Under Analysis

The idiosyncrasy of the medieval account is that pronouns in the original sentence get *new* antecedents in the analysis. Consider the sentence

Every man who owns a donkey beats it.

The demonstrative paraphrase yields

This man who owns a donkey beats it & that man who owns a donkey beats it & ..., and so on for every man who owns a donkey.

Now notice the natural antecedent of `it' in this analysis. It is *not* the NP `a donkey' in the quantifier part at the end. It is the NP `a donkey' in each conjunct containing `it'. This differs from the natural modern Russellian paraphrase:

(Every x)[x is a man who owns a donkey, x beats it]

where there is only one possible antecedent for `it', and it is, from the point of view of medieval theory, the *wrong* one. The right one has disappeared into the rightmost bound variable. To symbolize the medieval account we retain the demonstrative term, writing:

(Every x)[x is a man who owns a donkey, $that_x$ man who owns a donkey beats it].

The `it' is now anaphoric with the second `a donkey'. (That needs to be spelled out, of course; the point is that retaining the demonstrative makes such an anaphoric relation possible and natural.)[9]

What is distinctive about the medieval account is the repetition of the clauses about donkey owning in both the antecedent and consequent of the analysis. Kadmon 1990 in discussing a similar example, produces a similar repetition, which she attributes to a process she calls "accommodation." In my notation, her proposal would be[10] to expand:

(Every x)[x is a man who owns a donkey, x beats it]

to

(Every x)[x is a man who owns a donkey, (Some y)[y is a donkey, x owns y &

x beats it]].

In the context of her account the rationale is that something is needed here, and the particular repetition she produces of `a donkey' does the job. But the exact choice of what to repeat is made by the theorist, not by the theory. The medieval account yields this repetition, but it does so automatically.

6 Relative Clauses and the Pronouns Themselves

So far, I have discussed antecedents of pronouns, and how the anaphoric relation migrates under analysis. We have not yet talked about the pronouns themselves. But before we get to them, we need to analyze the relative clause construction. Here, the medievals did the obvious thing. They did not say how to analyze relative clauses in general, but they gave an analysis when the head of the clause is a name. An example is:

Socrates who is running is debating,

which becomes:[11]

Socrates is running and Socrates is debating.

If we apply this pattern to demonstrative terms, we analyze the relative clause in

(Every x)[x is a man who owns a donkey, that$_x$ man who owns a donkey beats it]

to get

(Every x)[x is a man who owns a donkey, that$_x$ man owns a donkey & that$_x$ man beats it].

We now have to address the phrase `a donkey' in the next to last formula and the pronoun that has it as antecedent. The medieval practice is to replace the pronoun *during* analysis of

quantificational structure, and to replace it by a phrase worded `this/that *same* one'. For example, the sentence

A man is running and he is debating

is equivalent to:[12]

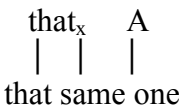
A man is running and that same one is debating.

Following this pattern, we give the `donkey' NP scope as small as possible while still including the pronoun that has it as antecedent. The result is

(Every x)[x is a man who owns a donkey, (Some$_y$)[y is a donkey, that$_x$ man owns that$_y$ donkey & that$_x$ man beats that same one]],

with the understanding that the phrase `that same one' is anaphorically linked to the preceding `that$_y$ donkey'.

Now, finally, how are we to treat the phrase `that same one'? The natural account, I think, is this: when the antecedent of `that same one' is `that$_x$ A' then `that same one' is to be symbolized `that$_x$ A'. This retains the `that', the `same' is effected by the identity of the subscripts on the `that', and repeating the `A' is the import of the word `one'.[13]



So the analysis becomes

(Every x)[x is a man who owns a donkey, (Some$_y$)[y is a donkey, that$_x$ man owns that$_y$ donkey & that$_x$ man beats that$_y$ donkey]].

We still have not attended to the relative clause and quantifier in the first clause, but we can handle those structures by the same theory that handles the rest of the example. If this is done, then the account already described yields the following:

(Every x)[(Some z)[z is a donkey, x is a man & x owns that$_z$ donkey],

(Some$_y$)[y is a donkey, that$_x$ man owns that$_y$ donkey & that$_x$ man beats that$_y$ donkey]].

7 A Simplification Using Variables

By the time we are through we can replace all of the terms of the form `that$_x$ A' by the variable `x' all by itself, and the result will be logically equivalent. So the analysis of the sentence above turns out to be equivalent in modern notation to:

(Every x)[(Some z)[z is a donkey, x is a man & x owns x], (Some y)[y is a donkey, x owns y & x beats y]].

This does not mean that the form with demonstratives is incorrect, it is just more complicated than it needs to be in the end. Nor does it mean that we could have skipped using the demonstratives in getting the formula itself; the formula would not have been reached if we had not used the demonstratives along the way.

8 Does the Theory Yield the Right Answer?

The theory says that `Every man who owns a donkey beats it' is true if and only if every man who owns at least one donkey beats at least one donkey that he owns. Is this right?

There are a number of conflicting contemporary accounts of these kinds of pronouns.[14] With regard to the example `Every man who owns a donkey beats it' they all agree that this

entails that every man who owns *exactly one* donkey beats that unique donkey that he owns. They disagree about what the sentence says, if anything, about men who own more than one donkey. I used to be sure that the sentence requires each such man to beat all of his donkeys, and so I would have rejected the medieval account. But speakers do not generally agree with me about this, and the best way to summarize the meaning of the sentence as usually understood is that it is unclear, and querying people about cases of multiple donkey-owning makes them uncomfortable.

The reading produced by the medieval account is ball-park-adequate given the unclarity of the data. It correctly entails that every man who owns exactly one donkey beats the unique donkey that he owns. It disagrees with my own original intuitions about men who own more than one donkey; here it requires only that such men beat at least one of their donkeys.[15]

Perhaps we can do no better. The medieval account is purely formal, which is both a strength and a weakness. The strength is its explicitness. The weakness is that any purely formal account must ignore some important pragmatic factors. Consider the following pair of examples:

Anyone who has a credit card should use it (to pay this bill).

Anyone who has a gun should throw it on the floor (now).

The second strongly suggests that people with two or more guns should throw all of them on the floor, but the first does not seem to suggest that a person with two or more credit cards should use all of them. No purely formal account will get both examples right. The medieval account correctly construes the first sentence as saying that at least one credit card should be used, and

thus it requires supplementation if the second sentence says that all guns need to be thrown on the floor.

One modern view (e.g. Kadmon 1990) is that when a singular pronoun has an antecedent, that antecedent must be read with a uniqueness presupposition. This would require us to read `Every man who owns a donkey beats it' as `Every man who owns a unique donkey beats it'. With such a presupposition built in, the medieval account is on a par with others in saying only that every man who owns a unique donkey beats a donkey he owns.

There are hosts of other examples to apply the theory to. I consider one last example, a case that causes trouble for many analyses:

Almost every man who owns a donkey beats it.

For this example we need the two-place quantifier

$(\Box\Box x)[Ax,Bx]$

meaning that almost all (e.g. over 90%) of the things that satisfy the first formula satisfy the second. Then the analysis goes (automatically) as follows:

$(\Box\Box x)$[x is a man who owns a donkey, $that_x$ man who owns a donkey beats it]

$(\Box\Box x)$[x is a man who owns a donkey, $(\Box y)$[y is a donkey & $that_x$ man who owns $that_y$ donkey beats y]].

This gives you most donkey owners beating some donkey that they own. It is thus interestingly different from Lewis's 1975 analysis which says that a majority of man-donkey ownership pairs are beating pairs.[16]

9 Implementing the Account

For a thorough evaluation of the account, it would need to be more precisely formulated. I have not pursued this here because the idea can and should be tested further in its unrefined form before spending time incorporating it into a precise framework. (But see the Appendix for one technical issue.)

The Medieval theory is an interpretive one, and it is most at home in such a framework. Here are some to consider.

Discourse Representation Theory: This is probably the easiest framework within which to embed the account, since the requisite expansions receive a natural formulation, and they can be formulated so as to avoid proliferation of syntactic complexity.

GB Theory: Within GB theory the medieval account is naturally formulated in terms of the transition to LF. In particular, the raising rules which adjoin quantificational NP's to higher nodes should be modified so that they no longer leave traces in their places, they leave demonstrative NP's whose N-bar parts are copies of the moved NP. This will seem ugly to some, and it is unmotivated by other parts of the theory. But the motivation is entirely semantical, so perhaps this incongruity is appropriate. The main worry here is that the added demonstrative material will be subject to all of the complexities of GB theory. This might be a nightmare, or it might be just what is needed to accommodate presently unforeseen ramifications.

Montague Grammar: In a framework like PTQ the idea is much more challenging to formulate. It is probably most natural to formulate the idea in terms of the "interpretive semantics" analogue of PTQ given in Cooper & Parsons 1976. But that is not the PTQ

framework itself. I think it can be done in the PTQ style by means of a properly worded reformulation of the quantification rules, but the reformulation would not be pretty.

Appendix: A Complexity

If we are not careful, the medieval account will run afoul of an old and familiar problem. When the antecedent of a pronoun *contains* the pronoun, there is no way to produce the required demonstrative term while paraphrasing the pronoun at the same time. This situation occurs in the sentence:

Every man who loves a woman who loves him will cherish her.

If you try to produce the demonstrative analogue of `man who marries a woman who loves him' you had better not try to simultaneously paraphrase `him', because the antecedent of `him' is `man who loves a woman who loves him', and the demonstrative term would then have to properly contain itself.

Fortunately, there is a way to avoid this problem. We get the problem only if we try to analyze the pronoun *too early* in the process. The medieval analysis supposes that we paraphrase the pronoun at the same time that we analyze its quantificational head. This works only in the simple cases considered. In complicated cases we need to depart slightly from the simple account and delay paraphrasing the pronoun until the relative clause containing it has been decomposed. If you keep applying the suppositional steps, you eventually reach a point where the head of a relative clause is a singular term, and *then* the pronoun can be paraphrased. For example, if we analyze

this_x man who loves a woman who loves him will cherish her

we get

this_x man loves a woman who loves him & this_x man will cherish her.

Notice that in this step the pronoun has once more acquired a *new antecedent*. The antecedent of `him' was `this$_x$ man who loves a woman who loves him', and now it is simply `this$_x$ man'. What is gained is that we *no longer have a pronoun whose antecedent contains the pronoun itself*. And thus the medieval analysis of pronouns can be coherently implemented, by replacing the pronoun with the appropriate demonstrative. Whether it is correct we have not yet seen, but we do get an analysis; the procedure is not incoherent.

Let's look at the example in detail to see how well it works. The sentence to analyze is

Every man who loves a woman who loves him will cherish her.

You do the `man' first, getting

($\Box$x)[x is a man who loves a woman who loves him ⁀

that$_x$ man who loves a woman who loves him will cherish her].

Then, just focussing on the consequent, we face the following issue: do we next analyze the relative clause in terms of a conjunction, or do we next analyze the "woman" NP inside it? I suggest, without going into details here, that we decompose relative clauses as soon as they get a singular term as head. So we get:

($\Box$x)[x is a man who loves a woman who loves him ⁀

that$_x$ man loves a woman who loves him & that$_x$ man will cherish her].

Next we face the issue of whether to analyze the pronoun "him" next or the "woman" clause. Ladies before gentlemen would yield

($\Box$x)[x is a man who loves a woman who loves him ⁀

($\Box$z)[z is a woman who loves him & that$_x$ man loves that$_z$ woman who loves him

& that$_x$ man will cherish her]].

This, however, yields a `him' that precedes its antecedent. It is not clear that this is devastating, but it is unnatural. So perhaps we need to adopt a different etiquette, and do the man first in this case, acting on the general policy that

A pronoun gets analyzed as soon as its antecedent becomes simple.

(Then, in doing examples, we can analyze an explicit pronoun in a relative clause simultaneously with analyzing the clause itself, similar to PTQ.) Doing it this way gives us

$(\Box x)$[x is a man who loves a woman who loves him $\frown$

$that_x$ man loves a woman who loves $that_x$ man & $that_x$ man will cherish her].

Now we need to analyze the phrase `a woman who loves $that_x$ man', and the question arises as to its scope. If we give it narrowest scope, the pronoun `her' in the last clause will end up unbound, and the analysis will be inadequate. This is the classical problem with "donkey" sentences. Both the donkey sentence and this one eventually require us to link a pronoun in a sentence to an antecedent in a preceding sentence. And this is generally problematic. But in both cases this happens in a special circumstance: the quantifier is the indefinite article, and the connective joining its sentence with the one containing the pronoun is conjunction. This is the one combination where all theories agree on what the answer should be. They disagree on how the answer should be reached, and they disagree on how it should be formulated, but they agree that the result should be equivalent to an existential quantifier binding the whole conjunction. In just adopting this proposal, we are in danger of local descriptive adequacy without a general theory to guide us, and that may indicate a blind alley. But sometimes progress is only made by exploring the alleys. So give the `woman' NP scope as small as possible while still including the pronoun that has it as antecedent. The result is

(□x)[x is a man who loves a woman who loves him ⁀

(□z)[z is a woman who loves that$_x$ man & that$_x$ man loves that$_z$ woman who loves that$_x$ man & that$_x$ man will cherish her]].

(This is the same thing we would have got by analyzing the relative clause before the pronoun it contained and then analyzing the pronoun on the basis of its antecedent that follows it. But doing things in this way we do not have to keep track of anaphoric relations to antecedents later in the analysis.) Next we focus on the last line; we decompose the woman's relative clause and then analyze the `her', getting:

(□x)[x is a man who loves a woman who loves him ⁀

(□z)[z is a woman who loves that$_x$ man & that$_x$ man loves that$_z$ woman & that$_z$ woman loves that$_x$ man & that$_x$ man will cherish that$_z$ woman]].

This seems to be correct.

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Notes

1. I say `*very* late medieval' because the period in question (1400-1600) would normally be classified as Renaissance. I am individuating the period by its themes, not solely by its dates.

2. This was not obviously the intent of the great developers of supposition theory from 1250 to the late 1300's: Peter of Spain, William Sherwood, Roger Bacon, William Ockham, Walter Burleigh, John Buridan. For them suppositional "descended forms" follow logically from the sentences under discussion, but they do not *analyze* those sentences because they are not generally *equivalent* to those sentences. (This is important in Geach's 1962 criticisms of supposition theory.) A burning issue in scholarship on supposition theory is: what was it supposed to be *for*? One popular answer is that it is supposed to yield an analysis of quantification. This answer accords well with later accounts, but poorly with earlier ones, because the earlier "analyses" are often obviously not equivalent in truth value to the sentences being "analyzed." (See e.g. Matthews 1964.) I assume equivalence in the theories under discussion.

3. For details of the mature theory see Ashworth 1974.

4. The idea is supposed to be that the demonstrative terms are accompanied by a feigned pointing at the entities in question. `This' and `that' are used heuristically for this purpose.

5. The Latin terms are *suppositio determinata*, *suppositio confusa et distributiva*, and *suppositio confusa tantum*. The terminology derives from the division of common personal supposition into *determinate* versus *confused*, with the latter category divided into *distributive and confused* versus *merely confused*. I follow the current custom of shortening `distributive and confused' to `distributive'. For late medieval

discussions of the notions see Loux 1974 sections 69-77, King 1985 chapter 3, and Ashworth 1978.

6. There was also recognition in practice of what we would nowadays call the scopes of connectives, e.g. acknowledging the ambiguity of `A or B and C', and negation was used in the stilted paraphrases to capture what we would call scope distinctions, as in the wording `Of a man not every donkey is running'. What is missing is any general device for giving something scope that does *not* extend to the end of the sentence. But it is not at all clear how important this is; it is a matter for investigation.

7. Assume that an atomic sentence containing such a term is false if the term fails to denote.

8. `The donkey' works this way too. In both cases it is customary to shorten `the A' when it is long, so that instead of `the donkey that she rode' we just say `the donkey'.

9. It is not difficult to spell out the account here. The suppositional analysis requires us to replace a quantificational NP with a demonstrative one by replacing the quantificational determiner with the demonstrative `$that_v$'. Since no other change occurs anywhere else in the sentence, there is no problem in correlating parts of the analysis with parts of the original, and so no problem in preserving anaphoric relations to NP's other than the one whose determiner is changed. We need only the additional policy that a pronoun whose antecedent was the NP whose determiner disappears gets as antecedent the unique NP that appears with the determiner replaced by the demonstrative. This policy is coherent for every case except when a pronoun has an antecedent inside the quantifier that disappears. A case of this might be `If you take two gallons of glue and pour them on the ground...', where `them' has `gallons' as antecedent. I think these can be got around, but a discussion would take me far afield.

10. I am altering her proposal in two ways. The first is an inessential change of subject matter, from women owning and talking to dogs to the medieval example of men owning and beating donkeys. The more important change is from `Most' to `Every'.

11. This example is found both in Albert of Saxony (see Boehner 1959, 109) and in William Ockham (1980, 124). There is no suggestion that these constructions were seen as non-restrictive relative clauses as opposed to restrictive ones. In any event, the paraphrase is clear.

12. Buridan 1985, 153. Buridan sees the form with the pronoun as explaining the form with the demonstrative, as opposed to the other way around. All authors of this period seemed to assume that the use of pronouns is clear and not in need of analysis.

13. The `one' is not present in the Latin; it appears only in translation.

14. It is well beyond the scope of this paper to evaluate them all. A balanced assessment would need to take account of Evans 1980, Heim 1982 and 1990, Jacobson 1977, Kadmon 1987 and 1990, and Kamp 1981. Heim 1990 gives a good overview of issues.

15. If you want the other reading, you cannot just treat `a donkey' as short for `any donkey' and give it wide scope. This works fine in the present case, but not in more complicated ones such as `Every man who owns a donkey that kicks him beats it', since you must give wide scope to `donkey that kicks him', and then the `him' is no longer within the scope of its antecedent.

16. If all men but one own one donkey and beat it, but the remaining man owns over half the donkeys in the world, then the medieval account makes the sentence true and Lewis's makes it false.