II THE NATURE OF LOGIC

The Logic of Pseudo-Thomas

Two points specify the meaning of the assertion that the Summary of the Entire Aristotelian Logic attempts to provide a science of scientific knowledge. First, in each of the treatises, Pseudo-Thomas reduces the elements of the proximate subject matter of logic to prior principles. Second, each of the treatises not only is an analytic foundation for those which follow it, but the logical material also is applied reflexively to itself.

The first point, that Pseudo-Thomas reduces the elements of logical subject matter to prior principles, is of fundamental importance. The procedure is easy to observe in the particular treatises, although a complete understanding of the reduction would be difficult in its details.

Pseudo-Thomas begins the first treatise, on the predicables, by explaining the cognitive process by which the predicables or universals originate.[1] By the action of the agent intellect, a form is abstracted from the material conditions in which it is found and is posited in the possible intellect.[2] When we understand man, for example, the form or nature of man is denuded of its spatial-temporal determination to an individual and is posited in the intellect itself as an intelligible likeness.[3] "Man," then, has two references, for it indicates either the nature itself

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[1] Tr. I, chap. i. [2] Ibid.

[3] Ibid. Notice that Pseudo-Thomas treats the form as an entity of itself, explaining abstraction as an unwrapping or separation from hic et nunc. Also, it is a matter of indifference to him whether the form posited in the intellect "dicitur species intelligibilis, vel secundum alios actus intelligendi vel verbum."

or its universality in the intellect.[1] The first is called a "first intention." When the intellect reflects upon itself and becomes aware of its contents, it sees that the nature present in it also is present in many individuals and predicable of them; the intellect thus forms a second intention of the nature and considers it as universal or predicable.[2]

This statement of the cognitional genesis of the primary and secondary intentions of a nature is not permitted to stand alone as a foundation for the treatment of the five predicables. Rather, Pseudo-Thomas relates it to a metaphysical consideration both of the intellect itself in its own nature and of things in their individual being. He begins by explaining the necessity on the part of the intellect for the process of abstraction; this process is required because the intellect itself is immaterial—that is, not affixed to a bodily organ—and, consequently, can receive only what is dematerialized.[3] On the other hand, the rather cryptic remarks about the foundation of the two conceptions in the individual things are explicated in detail in the following chapters.[4] Individuals have a single nature by which they really both agree with and differ from all other things. The nature absolutely present in individuals grounds the first intention; the comparative factors ground second intentions, for what is proper to the thing grounds the second intention of singularity, while what is common to many things grounds the various intentions of universality.[5] Moreover, he even troubles to explain the latitude which is required of real natures in order that they may be multiplied,[6] the nature

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[1] Ibid. [2] Ibid.

[3] Ibid. Notice that the metaphysical explanation is considered necessary for the understanding of the logical predicables: "Ad cognoscendum quinque universalis, seu praedicabilia, quae Porphyrius ponit, sciendum est quod, quia intellectus noster est separatus a materia . . . ." (Italics mine.)

[4] Ibid., chaps. ii-iv.

[5] Ibid., chap. ii. Therefore, although second intentions are said to be formed by the intellect, all of them are grounded in things, for "intentioni singularitatis respondet extra, illud quod est proprium Socratis in quantum est hic homo; intentioni vero universalitatis respondet extra, ut fundamentum illud in quo socrates conformis cum aliis rebus."

[6] Ibid., chap. iii. Such an explanation clearly would be unnecessary, unless Pseudo-Thomas considers the first intentions to be fully real in their own content. Cf. tr. II, chap. i, where he explains that the con-

of the relations of agreement and difference among individuals,[1] and the relations between the natures considered as parts and the things to which they belong considered as wholes.[2]

Pseudo-Thomas also relates the categories or predicaments to prior metaphysical principles. He begins the second treatise by distinguishing univocal, equivocal, and denominative predication.[3] However, he proceeds immediately to reduce the categories to supreme genera—that is, universals such as have been explained—and to apply the distinction between things and intentions to the categories.[4] To explain this distinction, he divides real being in its greatest universality into being by accident and being of itself; he divides the latter between being outside the soul and being in the soul; again, he divides the latter between real being and merely intentional being.[5] He then lays the metaphysical basis for his treatment of categories by explaining how real being, which is not a genus divided by differences, can be contracted by modes—that is, by relationships which can be distinguished in consideration.[6] As will appear in my

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tent understood is real being, tr. I, chap. iv, where he identifies the nature in the intellect with substantial form: "Notandum quod forma substantialis habet duplex esse." He explains that "humanity" signifies the nature as it is in the intellect; "human" as it is in matter, as saved by it; "man" as it is in matter, as perfecting it.

[1] Ibid. These relations are not according to being (secundum esse), but according to statement (secundum dici); they ground relations according to being just as first intentions ground second intentions. For the distinction of relations, see: tr. VI, chap. i.

[2] Tr. I, chaps. iii-iv. Pseudo-Thomas seems really to consider both substantial and accidental natures as separable parts of the whole individual things; cf. tr. IV, chap. vi.

[3] Tr. II, chap. i.

[4] Ibid.: "Ad videndum praedicamenta, sciendum est quod praedicamentum, seu genus generalissimum, dupliciter potest accipi. Uno modo pro ipsa intentione praedicamentali, seu universalitatis. Alio modo pro ipsa re, in qua talis intentio fundatur, ut dictum est: primo modo praedicamentum est ens rationis; secundo modo est ens reale."

[5] Ibid.

[6] Ibid.: "Ad sciendum autem praedicamenta oportet dividere ens reale." (Italics mine.) Pseudo-Thomas does not say what precise type of distinction holds between the modes, but his description approaches that of a distinctio formalis a parte rei, for he insists on the one hand that "in ente reali communiter sumpto inveniuntur aliqua entia habentia inter se

detailed treatment of the categories, this metaphysical reduction is not only a general foundation for the treatise, but is carried through in the actual treatment of the categories.

Pseudo-Thomas continues the same reduction of logical elements to prior metaphysical principles in his treatment of the proposition.[1] The first three chapters concern modes of signifying—the noun, the verb, and discourse—and follow rather closely Aquinas' commentary on Aristotle's On Interpretation.[2] However, Pseudo-Thomas next proceeds to explain the cognitive and metaphysical foundations of the proposition in two chapters on truth which are not parallel to Aquinas' commentary.[3] The emphasis in Aquinas[4] is on distinguishing the proposition from incomplete forms of speech and from types of speech which are neither true nor false. Pseudo-Thomas treats truth itself as a conformity—that is, a relation of reason—between the thing as it is understood and the thing as it is in reality.[5] He explains that truth is present primarily in the thing objectively in the intellect—that is, in the nature understood which is a first intention to which second intentions are attributed.[6] However, he allows as probable another opinion according to which truth consists in the conformity of a thing to an intellect informed by a likeness of it, and falsity

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diversos modos essendi, quibus non respondet una et eadem res, nisi forte ipsum ens in universali;" yet he says of the things distinguished by modes that they "non sunt duae res distinctae, sed distinctio inter ista solum est ex ratione."

[1] Tr. VII.

[2] Aquinas, In Peri herm., I, lect. ii-vi.

[3] Tr. VII, chaps. iv-v.

[4] Op. cit., lect. vii.

[5] Tr. VII, chap. iv.

[6] Ibid. Notice that the act of understanding—which has been treated indifferently with the form posited by abstraction in the intellect (tr. I, chap. i)—is here said to be subjectively in the intellect. From this it seems to follow that the abstracted form is received in the intellect as in a subject, not as an object known; in that case, the information of the intellect is not immediately conscious, but conscious knowledge begins only when the intellect reflects on its subjective content and considers it a first intention to which it applies second intentions. "Objective" and "subjective," however, do not have their modern connotations; "objective" refers to what is understood, while "subjective" refers to what is in a subject; the "object understood" always is in the intellect, while any real form is "in a subject."

consists in the non-conformity of the informed intellect to the thing.[1] He treats knowledge of the truth as a conscious awareness of the conformity between the intellect and the thing. Distinguishing between the first and second acts of the intellect, he explains that truth is present already in the first act of the intellect.[2] Truth becomes known perfectly, however, when it is apprehended objectively by comparing the form in the thing understood to itself as it is in the nature of things.[3] Or, according to the second opinion, judgment is true or false depending on whether the intellect judges itself to be informed by a likeness of the thing as it is or not.[4] Again, this reduction to principles is used in the treatise as a basis for the detailed considerations.

In his treatise on the syllogism considered absolutely, Pseudo-Thomas proposes to consider valid syllogistic forms irrespective of the necessity or probability of the premises.[5] He treats the validity of the forms, not inductively, but by proving them from self-evident principles.[6] In applying these principles, Pseudo-Thomas uses an argument whose final basis is the identity of an individual thing with itself.[7] Moreover, he exposes even the causes of the expressions "major term," "minor term," and "middle term" by reduction to the rational mode of human knowledge.[8]

The treatise on demonstration crowns this entire logic; the whole body of the former treatises has been developed in order that demonstration could be reduced to those prior principles through which it is known scientifically.[9] Therefore, although he follows to a great extent the commentary of Aquinas on the first book of Aristotle's Posterior analytics, Pseudo-Thomas' treatise on demonstration displays a subtle interweaving of the characteristic notions which he has developed. Here I note only two

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[1] Tr. VII, chap. iv. For this opinion, which Pseudo-Thomas favors (chap. v), I have discovered no foundation in any genuine work of Aquinas.

[2] Ibid. [3] Tr. VII, chap. v.

[4] Ibid. Notice that in either case, conformity exists before it is known objectively, although it has been said to be a relation of reason.

[5] Tr. VIII, chap. i.

[6] Ibid.: "Quod autem talis ordinatio sit bona, probatur per duo principia per se nota." The principles are the dicta de omni et nullo; he also adds a third principle for indirect reduction.

[7] Ibid., chap. ii. [8] Tr. VIII, chap. iv. [9] Proem.

striking points. First, Pseudo-Thomas combines the distinction between factual demonstration and demonstration of the reasoned fact with the distinction between the four questions which opens the second book of Aristotle's Posterior analytics.[1] He then reduces these distinctions to ones he has drawn previously between the being of essence and the being of actual existence,[2] and between substance and accident.[3] Second, Pseudo-Thomas does not begin his treatise with a discussion of pre-scientific knowledge.[4] Instead, after making the metaphysical distinctions, he proceeds to discuss what is known in demonstration before the conclusion, and what is known after the conclusion has been demonstrated.[5] In this division, he treats the middle term, which he had already identified as the cause both of the subject and of the property,[6] as the definition of both the subject and the property.[7] He then argues that although no science proves its own principles, the principles of sciences nevertheless can be proved by a superior science, at least by mathematics or dialectics. These sciences are said to be common; they prove the principles of all the sciences, mathematics proving them demonstratively and dialectics with probability.[8]

From all of these places in the text itself, then, my first point is sufficiently shown: Pseudo-Thomas reduces terms, propositions, and argument to prior metaphysical and epistemological principles. The effort to explain the origin of logical elements by the conditions both of things themselves and of the intellect's operations is characteristic of this logic. Moreover, it is in agreement with Pseudo-Thomas' own statement that the subject of a science must have prior parts to which it can be reduced for explanation.[9]

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[1] Tr. IX, chap. xi; Aristotle Post. anal. ii, chap. i.

[2] Tr. II, chap. ii.

[3] Tr. II, chap. i.

[4] Cf. Aristotle Post. anal. i, chaps. i-iii.

[5] Tr. IX, chap. xii.

[6] Ibid., chap. viii.

[7] Ibid., chap. xii: "Medium autem in demonstrationes est definitio subjecti et passionis."

[8] Ibid.

[9] Tr. IX, chap. xiv: "Ad hoc autem quod subjectum sit scibile nobis, oportet quod habeat partes priores se."

I shall now proceed to my second point: that each of the treatises is an analytic foundation for those which follow it. The fact that the treatises are connected analytically is evident from Pseudo-Thomas' Proemium.[1] Here I wish to point out texts which show that the analytic priority of each treatise to the next includes a significant material foreshadowing of its structural principle of organization—that, in other words, logical structure is reflexively applied to itself.[2]

The predicables must precede the categories, since the categories are merely an organization of universals into categorical orders—that is, Porphyrian trees.[3] The treatment of the predicables involves three factors: the distinction between things and intentions;[4] the distinction between the predicables and being;[5] and the distinction between the substantial predicables—genus, species, and difference—and the accidental predicables—property and accident.[6] Now, the treatise on the categories begins by using all three of these distinctions; for categories are divided between realities and intentions, being is divided by modes into the supreme genera, and the primary modes dividing being are substance and accident.[7]

The categories must precede the proposition, since the terms which are parts of the proposition signify things in one of the categories.[8] The treatment of the categories develops many new distinctions, among them one between action and passion;[9] another, between real relations and relations of reason;[10] and another the basic distinction between substance, quantity, quality, and relation.[11] Pseudo-Thomas uses these distinctions in his treatise on the proposition. He uses the distinction between action and passion in treating the modes of signifying.[12] He uses the dis-

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[1] Cf. supra, pp. 18-20.

[2] The point is seen more clearly in the examples than in its general statement.

[3] Proem.; Tr. II, chaps. i and iv.

[4] Tr. I, chap. i.

[5] Ibid., chap. v.

[6] Ibid., chaps. vi and viii.

[7] Tr. II, chap. i.

[8] Proem.

[9] Tr. VI, chaps. ii and v.

[10] Tr. V, chap. i.

[11] Tr. II, chap. i.

[12] Tr. VII, chap. i. He expressly refers to the previous treatise.

tinction between real relations and relations of reason in discussing the nature of truth.[1] Finally, he uses the distinction between substance, quantity, and quality in reference to determinants of the proposition in order to divide the proposition itself.[2] Moreover, after making the divisions in a systematic way, he proceeds to treat the relations among propositions themselves—that is, their oppositions and equivalences.[3]

The proposition must precede the syllogism considered absolutely, since propositions are parts of the syllogism.[4] Since it is common in the tradition, it is not surprising that Pseudo-Thomas uses the divisions of the proposition to divide kinds of syllogism, nor that he makes use of the oppositions established in the earlier treatise in that on the syllogism. However, Pseudo-Thomas includes a treatment of hypothetical propositions, as we have seen.[5] This treatment has an important significance in establishing the analytic continuity of his logic, for he states the three self-evident principles, by which he proposes to prove the validity of syllogisms, in the form of hypothetical propositions.[6] Moreover, he treats the syllogism as a consequence, explaining its validity on the model of the truth of a conditional proposition.[7]

The syllogism must precede the demonstration, since every demonstration is a syllogism.[8] Here, of course, the contribution by the former treatise of structural principles to the latter one is to be expected, because the relation between them is not explained as one of part to whole,

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[1] Tr. VII, chap. iv. [2] Ibid., chaps. vi-vii.

[3] Ibid., chaps. viii-ix. My point is not that the treatment of oppositions and equivalences itself is significant—indeed, Aristotle's On Interpretation is devoted largely to that topic—but that Pseudo-Thomas derives the relative treatment of propositions from determinants established and systematically treated on the basis of the distinction of his first three categories.

[4] Proem. [5] Cf. supra, p. 20.

[6] Tr. VIII, chap. i. The propositions are stated literally as temporal hypotheticals—"Quando...tunc..."—but obviously are intended to be conditionals; cf. tr. VII, chap. xiv.

[7] Ibid., chap. v. He says that "illa erit vera forma syllogismi, quae applicata cuicumque materiae semper si praemissae erunt verae, sequetur ex eis conclusio vera."

[8] Proem.

but as one of form to matter.[1] However, the continuity of the treatises is even more striking than might be expected. In the last chapter of the treatise on the syllogism considered absolutely, Pseudo-Thomas treats the causal reduplicative proposition, discussing it on the basis of his treatment of syllogistic consequence.[2] For the truth of the causal reduplicative proposition, it is necessary that three categorical propositions implicit in it should be true, that a conditional expressing the consequence implicit in it also should be true, and that the predicate of the subordinate clause on which the reduplication falls should express the cause of the main predicate.[3] These notions of absolute necessity and causal import, established before the treatise on demonstration opens, indicate the essential conditions of demonstration itself; for the necessary relation implied by the conditional exponent of the causal reduplicative is expressed by the interpretation of the dictum de omni applied to demonstration,[4] and the causal connection implied in the causal reduplicative is expressed by the purely causal interpretation of the middle term of the demonstration.[5]

From these places in the text, then, my second point is shown: the analytic connection of the treatises in Pseudo-Thomas' logic includes another less obvious, but very significant, unity—namely, that each of the prior treatises treats in its subject matter factors which are applied as structural principles of organization in the succeeding treatise.[6] Now, this reflexive application of factors discerned in the subject matter of logic to the logical consideration itself is to be expected, for Pseudo-Thomas is developing a science of science; if logic is a science of science, it should be self-applicable not only in its organization, but even

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[1] Ibid., chap. 1. My entire second point might now be restated: Pseudo-Thomas, throughout his logic, uses the elements of logical complexes not only as material, but also finds in them formal principles for the logical consideration of the wholes of which they are elements.

[2] Ibid., chap. xviii. The treatment of the causal reduplicative appears here as a kind of appendix; I believe that its relation to demonstration both explains and is verified by its very presence here.

[3] Ibid. [4] Tr. IX, chap. ii. [5] Ibid., chap. viii.

[6] I have by no means attempted to point out all of the examples of this continuity; I have merely indicated a few instances which seem clear and particularly important.

in its content. In treating the syllogism considered absolutely, Pseudo-Thomas even uses reflexivity in the very same treatise, for he proves conversions syllogistically.[1]

If these two points sufficiently specify the meaning of the statement that Pseudo-Thomas' logic is a science of scientific knowledge, however, we still must ask how this work is supposed to satisfy our natural desire for scientific knowledge. Why did the author not write a treatise on physics or theology, or construct a methodology, instead of undertaking a scientific explanation of science itself, if he wished to satisfy our desire for scientific knowledge? Why, in short, does he not notice what seems an obvious non-sequitur in his argument from the natural desire for scientific knowledge to the necessity of a science of scientific knowledge itself?[2]

Now, Pseudo-Thomas provides us with no explicit statement concerning this point, but he does provide us with certain clues from which, perhaps, I can infer the underlying intent of his work.

First of all, he treats intentions in the metaphysical context of distinctions between individuals and universals, and between being and its modes.[3] The intentional is what is an object for the intellect—that is, anything insofar as it is understood.[4] Intentions are divided between the real natures of things present in the intellect and the properties of these natures which the intellect forms and applies to them when they are considered in reference to the individuals from which they were abstracted.[5] Both first and second intentions are founded in things, although the first intentions are the very forms in the things, while second intentions refer to the things only in comparison with one another.[6] Real being, then, is not necessarily non-intentional; rather, a being of reason is what is merely intentional—that is, what never can be possessed by anything, even

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[1] Tr. VIII, chap. ii.

[2] Cf. supra, pp. 18-26.

[3] Tr. I, chap. i; Tr. II, chap. i.

[4] Ibid.

[5] Tr. I, chap. i.

[6] Ibid., chap. ii. The foundation of second intentions is "remote" precisely for this reason; universality as it is first known is not merely negative, although it is a second intention, not a nature.

by the intellect, but only can be thought.[1] The natures which the intellect receives are at one and the same time intentions and real beings.[2]

Now, it is real being which primarily is divided into the ten categories in which all forms and individuals are found.[3] Real being is contracted by modes which are said to be real; nevertheless, the distinctions between them are only of reason—that is, the distinctions are intentional beings.[4] To these distinctions, nothing corresponds except being itself in the universal.[5] It seems to me to follow that being itself is a single, pervasive, and real nature in which all natures and individuals share.[6] Now, being itself is primarily understood of everything.[7] However, if being also is a nature, then this understanding of being is a positing of its nature in the intellect so that, on the intellect's reflection, it will become a first intention. Yet nothing can be added to being.[8] Consequently, it seems that all of our knowledge is an explication for conscious consideration of the content of this first intellectual possession.

In one way, the individual is most basic, since natures actually exist only in and by the individuals.[9] Nevertheless, Pseudo-Thomas also grants a proper being to natures; he considers the distinction between being of essence and being of actual existence to be a distinction between two diverse things.[10] That Pseudo-Thomas should take this position is understandable, for if being itself is a nature shared by all natures and individuals, then it would seem that these natures should have being simply in themselves.

Of course, Pseudo-Thomas maintains that demonstration causing scien-

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[1] Tr. II, chap. i.

[2] Notice, however, that the nature is an intention not insofar as it is in the intellect as in a subject, but insofar as it is an object understood.

[3] Ibid. [4] Ibid. [5] Ibid. Cf. supra, pp. 29-30.

[6] Notice that Pseudo-Thomas says (Ibid.) "being" "per prius dicitur de substantia in qua maxime salvatur sua realitate." (Italics mine.) He speaks (Tr. I, chap. iv) similarly of natures being "saved" in matter.

[7] Tr. I, chap. iv. [8] Tr. II, chap. i. [9] Tr. II, chap. ii.

[10] Ibid.: ". . . esse essentiae et esse actualis existentiae differunt realiter, ut duae diversae res . . . . "

tific knowledge is properly causal knowledge of a subject.[1] Nevertheless, considered in the context of Pseudo-Thomas' earlier treatises, this position assumes a special significance, since he maintains that demonstration of the reasoned fact is by way of essential being—that is, essence as quiddity itself.[2] With this explanation, the position that scientific knowledge is through causes comes to mean that it requires the relation of realities in the context of real being—that is, that the possession of a scientific knowledge of anything presupposes the explication of being. However, since this explication involves second intentions—for example, the distinctions between the modes which divide real being—it seems that a scientific knowledge of anything requires a determination not only concerning the realities which become objects of the intellect, but also concerning the second intentions which the intellect itself forms and ascribes to those first intentions in the course of its operations. One way to explain the purpose of Pseudo-Thomas' logic, then, is to say that it provides the reduction of scientific knowledge to its ultimate principles, a reduction which is necessary in order that there should be any scientific knowledge at all.

Another clue with which Pseudo-Thomas provides us is the distinction he makes between the treatises on the predicables and the predicaments, on the one hand, and the treatises on the proposition, the syllogism, and demonstration, on the other. These treatises are continuous with one another, as I have pointed out; nevertheless, the division at this point is drawn more sharply than elsewhere.

At the end of his treatises on the categories, Pseudo-Thomas explains that he has treated the things pertaining to the first act of the intellect insofar as they are things understood; it remains, however, to consider them as to modes of signification, since logic not only is a rational science, but also a linguistic science of the syllogism and its parts considered as to modes of signification.[3] Consequently, the section on the proposition considers it as a sentence which signifies judgment, in which truth and falsity are present.[4] Discourse and its parts

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[1] Tr. IX, chap. 1.
[2] Ibid., chap. xi; cf. <u>supra</u>, pp. 31-32.
[3] Tr. VI, chap. xviii.
[4] Tr. VII, chap. v.

are not natural things, nor are they natural instruments of the intellect. Still, they are instruments of the intellect, and the intellect is above all natural things. Speech and its parts are instruments of the intellect, for an instrument is defined by its uses, and the function of speech is to communicate the knowledge of one person to another.[1] The treatises on the proposition, the syllogism, and demonstration, then, are concerned with discourse insofar as it signifies truth, for this study is ordered to demonstrative knowledge, in which man is led by hearing to consider truth through reasoning from what is proper to the thing.[2]

Now, Pseudo-Thomas divides his treatises according to the principle of three operations of the intellect: simple understanding, judgment, and reasoning.[3] However, if I am correct in supposing that for him all knowledge is an explication of the initial nature of being, then it would seem that the operations of knowledge do not so much add to our original knowledge of things as to our awareness of what is implicit in our intellectual possession. This supposition is borne out by the fact that the distinctions between the operations of the intellect are not solidly maintained. Thus, Pseudo-Thomas seems to consider the very first act of reflection, in which the nature becomes a first intention and second intentions are formed, to involve a comparison between the nature understood and the form in the individual things.[4] However, such a comparative act defines the judgment in which truth is known.[5] Moreover, Pseudo-Thomas explicitly says that our intellect is discursive in understanding natures, since it begins by understanding being, proceeds to substance, and so on.[6] This treatment of the operations of the intellect seems to indicate again that "intellectual knowledge" is ambiguous, meaning both the initial reception of natures—including the nature of being itself in which everything is implicit—and the gradual explication which makes us fully aware of our possessions.

Pseudo-Thomas tells us that science is the possession of the demon-

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[1] Ibid., chap. iii. [2] Ibid.
[3] Tr. VII, chap. i; tr. VIII, chap. i. [4] Tr. I, chaps. i-ii.
[5] Tr. VII, chap. v. [6] Tr. II, chap. ii; cf. tr. VIII, chap. iv.

strated conclusion acquired from the very speculation of it.[1] In other words, science is a knowledge—that is, an object of the intellect, having intentional being—which is transformed, simply by being thought, into a possession of the intellect. It seems to me that such a transformation could not occur unless what we know really is implicit in the primary possessions of the intellect; when the transformation does occur, it comes about through the intellect achieving such self-consciousness that it is capable of taking complete possession of itself. Applying Pseudo-Thomas' treatment of language to his work itself as a whole, it seems that the work is for those who have not yet attained the transformation in which scientific knowledge consists, and it aims to lead initiates to that achievement by a discourse of reason from what is proper to the nature of the thing itself under consideration—all of the things that can be known by scientific knowledge.

If we take seriously Pseudo-Thomas' statement[2] that mathematics demonstratively proves the proper principles of the other sciences, it seems to me that his logic also might be called "a reduction of mathematics to its ultimate principles," for insofar as Pseudo-Thomas reduces science to the fundamental causes of science—the intellect and being—he is reducing the most common science of all to its principles. In this connection, it is interesting to notice that he states an intellectual derivation of numerical unity which parallels the derivation of transcendental unity. He explains that the intellect first understands being, then distinction, next unity, and finally multitude; correspondingly, it understands the continuum, division, numerical unity, and number.[3] The difference between these is not any real thing, but two factors: first, that the second set of concepts does not apply to immaterial beings; second, that the second implies the measurement of discrete things—that is, material individuals.[4] Pseudo-Thomas says very little about mathematics in his logic, except for the single highly significant statement to which I have referred; nevertheless, it may not be overly imaginative to think that in this log-

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[1] Tr. IX, chap. i: "Cum enim scientia sit habitus conclusionis demonstratae acquisitus ex ipsius speculatione; est sciendum quid sit scientia, et quomodo acquiratur, necesse est scire quid est demonstratio."

[2] Ibid., chap. xii. [3] Tr. III, chap. i. [4] Ibid.

ic, if it were fully developed, mathematics could become the subordinate part of logic concerned with the existential realm of real being.

In summary, then, Pseudo-Thomas' logic is a science of scientific knowledge. Demonstrated knowledge becomes known, through logic, as a knowledge of being, for demonstrative knowledge presupposes a knowledge of its own causes. Such a logic is aimed to terminate the process of the reason. Logic completes knowledge, not by application or use, but simply by being known. Thus, the reflexivity of Pseudo-Thomas' logic is necessary to it, for logic achieves its purpose by this device; if logic were not self-applicable, a further knowledge would be necessary to achieve complete science. Pseudo-Thomas' logic might be called a "science of second intentions," for beings of reason belong properly to its subject matter; however, it considers second intentions in their foundations both in real being and in the nature of the intellect itself.

The Logic of William Ockham

For Ockham, logic is practical rather than speculative; it is an art rather than a science. Although Ockham's logic is directed in a special way toward the achievement of scientific knowledge, science is not its sole objective; moreover, even to the extent that logic is directed toward science, it does not seek this objective by reflection upon scientific knowledge, but by regulation of the acts of the intellect. Ockham does distinguish between first and second intentions; however, he draws this distinction otherwise than does Pseudo-Thomas, and the distinction has a different significance for Ockham's logic than it does for Pseudo-Thomas'.

In his own prefatory letter to his Summary of Logic, Ockham explains the request which he is trying to fulfill.[1] Significantly, he considers the request to be for a collection of the rules of the art of logic.[2] Logic is the most suitable instrument of all the arts; without it, no science can be possessed perfectly.[3] A scientist's knowledge of logic is

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[1] Ockham, Sum. log., I, Proem.

[2] Ibid. He says that his correspondent has been trying for a long time to induce "ut aliquas regulas artis logicae in unum tractatum colligerem ac tuae dilectioni transmitterem."

[3] Ibid.

compared with a mechanic's knowledge of his tools; although the use of logic does not wear it out, it is known just as a mechanic knows his tools, since the scientist perfects his own knowledge of how to use his intellectual tool by using it.[1]

In the Proemium to his Golden Exposition, Ockham explains the utility of logic; he says that this utility is multiple. In first place, Ockham puts the facility which logic teaches for discerning true from false conclusions, when these are offered as propositions, demonstrated from self-evident premises, capable of being known by scientific knowledge. Logic also is useful for disputation, however, since it teaches the relations between propositions.[2]

Ockham sometimes refers to logic as a "science;"[3] however, this designation of it must be interpreted in a broad sense. In the Prologue to his commentary on the Sentences, Ockham explains that logic, grammar, and rhetoric really are practical, not speculative. These disciplines direct the intellect in its operations; these operations are in the power of the intellect by means of the will. On the other hand, logic is classed with the arts, not with the normative practical sciences, since it does not dictate what is to be done, but shows how something is to be made.[4] Logical rules, therefore, are hypothetical imperatives, not categorical ones.[5]

The works whose making logic directs are propositions, syllogisms, and the like. Such works are our own productions, since they cannot be made except by us. These are not exterior works, except secondarily, but are intentional. Therefore, logic is strictly practical, not speculative.[6] Logic, then, is not primarily concerned with linguistic constructs,

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[1] Ibid.

[2] William Ockham, Expositio aurea et admodum utilis super artem veterem, I, Proem., or, quoted by Moody, op. cit., p. 32, n. 2.

[3] Ibid.

[4] William Ockham, Sent., I, Prol., qu. 4, llN, quoted in Prantl, op. cit., III, p. 331, n. 741.

[5] Of course, the condition of application would normally be fulfilled, since man naturally desires to know; however, the end is outside the jurisdiction of logical regulation.

[6] Ockham, Exp. aur., I, Proem., quoted loc cit., n. 742.

but with intentional constructs within the intellect.

Of course, if logic consists of rules showing how to construct propositions and arguments in and by the intellect, it must presuppose some material from which the products of the intellect can be made. Not everything in Aristotle's Categories, for example, is practical; Ockham considers this work mainly speculative and thinks it practical only insofar as it deals with language. However, Ockham finds nothing untoward in this, since many practical matters do depend on speculation.[1] The practical part of logic, then, has to do with our works; the speculative does not. These constructions are propositions and arguments; given as material the natural signs or simple concepts, the intellect produces these complexes in itself.[2]

To understand how Ockham distinguishes logic from other sciences and relates it to them, it is necessary to explain his distinction between first and second intentions. To understand this distinction, however, it is necessary to know Ockham's doctrine of the simple concept as a natural sign, since Ockham does not treat intentions as natures posited in the intellect—as Pseudo-Thomas does—but as signs naturally caused by things in the intellect.

Ockham says that an intention of the soul is something in the soul which naturally signifies something else. He compares these intentions to the words of which linguistic constructions are made. On the one hand, the intention is related to a mental construct as a single word is related to a linguistic construct. On the other hand, the elements of linguistic discourse are significant conventionally, while intentions naturally signify their objects.[3] About the exact nature of these intentions, Ockham was in some doubt. Nevertheless, he seems finally to have determined that they are identical with the acts of the intellect themselves and, hence, are qualities in the soul.[4] The distinction between first and second intentions is that first intentions signify precisely things which are not

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[1] Ockham, Exp. aur., II, Prooem., quoted loc. cit., n. 743.

[2] Cf. Moody, op. cit., p. 35. [3] Ockham, Sum. log., I, chap. xii.

[4] Ibid.; cf. Philotheus Boehner, O. F. M., "The Realistic Conceptualism of William Ockham," Traditio, IV (1946), pp. 315-319.

signs, while second intentions are signs of signs.[1] This distinction must be understood very strictly, since there are first intentions which signify intentions, but not insofar as they are signs.[2]

Now, for Ockham, certain of our concepts are universals—that is, they signify many things equally. Since universality belongs to signs insofar as they are signs, our concept of universality is a second intention.[3] Properly speaking, the universality of a single intention signifying many things is the only universality there is, for there is no universal apart from signs, and there is no common nature in individual things.[4] This position does not reduce universality to mere nominal community, however, since the universal intention is a single knowledge of many individual things, naturally caused by its objects.[5]

For Ockham, then, first intentions are not natures of things posited in the intellect, since there are no separable natures in things which could be posited as realities in the intellect; rather, first intentions are acts of knowledge—qualities in the intellect—caused in the intellect naturally by the action of real things. Second intentions, for Ockham, are not properties which the intellect ascribes to natures in itself when it considers them in relation to singulars outside, for first intentions are not natures; rather, second intentions are another set of simple acts of knowledge—qualities in the intellect—caused by first intentions insofar as they are signs.[6]

For Ockham, consequently, logic as a practical science is not con-

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[1] Ockham, Sum. log., I, chap. xii.

[2] Thus, a psychological treatment of intentions, which would treat them as qualities in the soul in relation to things, would signify them with first intentions; logic, however, is not properly concerned with intentions considered in this way. Cf. Moody, op. cit., p. 34.

[3] Ockham, Sum. log., I, chap. xiv. [4] Ibid., chaps. xv-xvi.

[5] Cf. Boehner, loc. cit., pp. 308-311.

[6] Ockham, Sum. log., I, chap. xii: "Et ideo sicut nominae secundae impositionis significant ad placitum nomina primae impositionis, ita secunda intentio naturaliter significat primam." Ockham's distinction between names of first and second imposition applies only to linguistic signs. Names of first imposition may correspond to either first or second intentions, but they signify things which are not linguistic signs; names of second imposition signify only linguistic signs. (Ibid., chap. xi.)

cerned with incomplex intentions, for simple intentions are not works in our power, but are works of nature. The speculative part of logic does consider these elements since they are materials out of which are constructed the complexes whose making logic directs.[1] Logic differs from other sciences, because the rules of logic are composed of second intentions used significatively—that is, standing for first intentions of which the propositions of real sciences are formed. Real sciences are constructed of first intentions used significatively—that is, standing for real things.[2]

Ockham's discussion of the proposition, "Man is a species," is illuminating in this connection. Now, according to Ockham, terms used in propositions, but only in propositions, have supposition—that is, a property of standing for something in a definite way.[3] Supposition, then, presupposes signification, for only signs can be combined to form propositions, and signs—at least, natural signs—are significant by themselves.[4] Supposition primarily is divided into personal, simple, and material. Personal supposition is the property of a term used to stand for what it signifies and is held in its significance; it belongs to any sign, whatever its intention or imposition, provided it is used in a proposition to stand for what it signifies. Simple supposition is the property of a term used to stand for an intention of the soul, but not for the thing or things it signifies. Material supposition is the property of a term used to stand for a linguistic sign.[5] Of course, a term used in simple or material supposition stands for signs insofar as they are signs, not insofar as they are things themselves; but terms used in these suppositions do not stand for the things which they themselves signify. According to this analysis, in the proposition, "Man is a species," "man" is a term of first intention having simple supposition, while "species" is a term of second

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[1] Moody, op. cit., pp. 34-35. [2] Ibid., p. 33.

[3] Ockham, Sum. log., I, chap. lxiii.

[4] Ibid., chap. i. Notice that Ockham defines the mental term here with reference to supposition, since he is interested in the term insofar as it can be part of a proposition; nevertheless, supposition belongs to terms only in propositions, although terms are naturally ordered—we might say, "in potency"—to be used to stand for things.

[5] Ibid., chap. lxiv.

intention having personal supposition.[1]

Now, Ockham inquires about this same proposition: to what science does it belong? He denies that it belongs properly to logic, since the first-intentional significance of the subject requires a knowledge of real things; if such propositions belonged to logic, then no one could know logic completely without knowing the natures of all things. On the other hand, he also denies that the proposition properly belongs to any particular real science, since the applicability of this predicate, "species," which has second intentional significance, cannot be known without a knowledge of logic; if such propositions belonged to real sciences, then no one could have a real science which was not subordinated to logic for its principles, not merely for its production by the use of logic as a tool. His solution, therefore, is that such propositions must belong to special sciences distinct from and subordinated to both logic and the particular sciences, or else they belong to metaphysics, since both first and second intentions can fall under the consideration of metaphysics.[2] As Ockham explains elsewhere, metaphysical terms such as "being" and "one" are peculiar, for although they are themselves first-intentional in their significance, they are common to all signates, whether they be things which are not signs, or whether they be signs.[3]

From this analysis, it is clear that Ockham establishes a careful distinction between levels of language or thought, such that logic is sequestered from a consideration of realities and is limited to the realm of signification.[4] With these distinctions, the reductionism which Pseudo-Thomas was able to carry out—because, for him, reality and intention overlap in first intentions—is impossible. It follows that Ockham's logic cannot lend a foundation of principle to the knowledges obtained in real sciences. Not only the practical part of logic, which regulates the construction of complexes of signs, but even the speculative part of logic, which surveys the materials themselves, has a subject matter clearly

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[1] Ibid. [2] Ibid., III-II, chap. xxii. [3] Ibid., I, chap. xxxviii.

[4] Cf. Philotheus Boehner, O. F. M., "Ockham's Theory of Supposition and Notion of Truth," Collected Articles on Ockham, ed. E. M. Buytaert, O. F. M. (St. Bonaventure, N. Y.; The Franciscan Institute, 1958), pp. 243-245.

distinguished from the subject matters of real sciences.

Nevertheless, Ockham does maintain a sharp distinction between the part of logic which deals with terms and the parts which deal with constructions. Thus, in his Summary of Logic, we find the first part filled with distinctions. First, he lays down many general distinctions of terms.[1] Second, he defines and distinguishes certain terms of second intention or second imposition.[2] Third, he defines and distinguishes certain terms of first intention.[3] Finally, he defines and distinguishes the suppositions of terms.[4] Now although Ockham has promised a collection of rules,[5] it is only in his treatment of supposition that rules begin to appear; however, they do appear throughout the remainder of the work. Now, the reason for this is evident, since it is only in dealing with supposition that Ockham begins treating terms as they are used as materials by operations of the intellect constructing propositions and arguments.

If these considerations are sufficient to determine the meaning of the statement that Ockham's logic is an art, still the question arises: why is such an art necessary?

It is certainly not the case for Ockham, as it is for Pseudo-Thomas, that logic is necessary to unfold for conscious awareness the content of a primary possession of the intellect. For Ockham, our primary knowledge is a distinct intuition of individual things; this is true not only of our sense experience, but also of our intellectual knowledge.[6] It is only secondarily that the mind passes on to abstract and to universal knowledge.[7] The concept of being is a most common concept—that is, it indifferently signifies everything.[8] Now, since the common concept does not contain any reality found in the things it signifies, but merely signifies them, and since the signates of a common concept only participate in it in

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[1] Ockham, op. cit., chaps. i-xiii.

[2] Ibid., chaps. xiv-xxxvii. [3] Ibid., chaps. xxxviii-lxii.

[4] Ibid., chaps. lxiii-lxxvii. [5] Ibid., Proem.

[6] This point is treated in Matthew C. Menges, O. F. M., The Concept of Univocity regarding the Predication of God and Creature according to William Ockham (St. Bonaventure, N. Y.: The Franciscan Institute, 1952), pp. 16-20.

[7] Ibid., pp. 19-21. [8] Ibid., p. 25.

the sense that it is predicable of them,[1] it follows that our primary knowledge of things is adequate and distinct of itself and that perfect knowledge is not to be gained by explicating the content of our concept; it is not a first intention in Pseudo-Thomas' sense—that is, it is not a universal nature. Moreover, it cannot be the case for Ockham, as it is for Pseudo-Thomas, that logic is necessary to permit the intellect to reduce objects understood to principles by a reflexive consideration of them. There are two reasons for this. In the first place, Ockham's preferred view of the concept does not admit a distinction between it and the act of knowing, possessed by the intellect as a subject.[2] In the second place, the direct and the reflexive acts of the intellect—that is, the act by which the intellect understands something outside the soul, and the act by which this act itself is understood—cannot be the same act according to Ockham.[3]

According to Ockham's statement of the utility of logic,[4] therefore, it must be said that the art of logic is considered necessary by him in order to achieve a sure distinction between truth and falsity in scientific knowledge and a proper procedure in disputation. The reason is that the act of scientific knowing itself is not immediately of things, but of demonstrated propositions—that is, of complexes formed by operations of the intellect which are in its power by means of the will.[5] Of course, the terms in the propositions of real sciences signify real things and are used to stand for them, unlike the terms in the rules of logic.[6] The log-

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[1] Ibid., pp. 21-23.

[2] Ockham, Sum. log., I, chap. xii. It is precisely because such a distinction is unnecessary that Ockham's preference is for the position which identifies the concept with the act of the intellect itself. Cf. William Ockham, Quodlibeta septem, trans. Richard P. McKeon, Selections from Medieval Philosophers, II (New York; Charles Scribner's Sons, 1930), quod. IV, qu. xix, pp. 386-391.

[3] Loc. cit., quod. II, qu. xii, pp. 393-395. [4] Supra, pp. 41-43.

[5] Ockham, Sum. log., III-II, chap. i. "Science," as it enters into the definition of demonstration, is an evident knowledge of the necessary truth—that is, the proposition—which is demonstrated. Cf. Boehner, "Theory of supposition . . .," p. 244; also pp. 254-257, where he explains that Ockham always treats the concept of truth itself as a second intention.

[6] Cf. Moody, op. cit., pp. 43-44.

ical art is necessary to direct the intellect in forming the propositions which are direct objects of scientific knowledge, and other complexes of signs, because such knowledge is not concerned immediately with individual things which are naturally known by distinct and adequate intuition and abstraction. The intellect operates in forming the propositions which sciences know and which disputants argue about, and the intellect can go astray in its operations unless it is regulated by a logical art.

In sum, Ockham considers logic to be an art. Logic is concerned with the constructions which the intellect makes, and which it is in the power of the intellect to make well or badly. Logical propositions themselves are made up of signs of second intention; the propositions whose construction logic regulates are made up of natural signs of first intention. Natural signs in their uncomposed condition are given the intellect without it operating; of themselves, these signs have determinate signification and are in potency to being used to stand for the things they signify. Consequently, insofar as logic considers incomplex natural signs it is speculative, but this consideration is preparatory to the art, for it is a knowledge of the material upon which the art works or from which logic's own propositions are composed. In its proper business, logic is practical—or better, productive—for it teaches us how to make significant complexes, including the propositions of real sciences, from the given materials. For Ockham, our acts of scientific knowledge immediately concern fabrications of our own minds; how these propositions are composed, therefore, depends on our art.

Although with very different meanings, it is true both for Pseudo-Thomas and for Ockham that logic is concerned with the objects of scientific knowledge. For Pseudo-Thomas, logic is required in order to resolve science to the principles which are really ultimate, since without such a resolution, the transformation by which the object of the intellect becomes its possession cannot occur. For Ockham, logic does not fulfill science by a theoretical consideration, but by regulating the operations of the intellect in which scientific propositions are constructed. Again, for both authors, the treatment of terms is distinguished sharply from the treatment of propositions and arguments, and the terms have an ultimate value in knowledge. However, this holds for Pseudo-Thomas inasmuch as the

treatises on terms are concerned with things understood, in which the whole of our knowledge is implicit, while the other treatises deal with the process of explication. For Ockham, on the other hand, the consideration of terms is important because they are material for the constructions which logic directs, suited by their natural signification to stand for things in such propositions. Again, for both authors, the proposition and the argument, as logic considers them, do not really add to our knowledge of the things which are known in our primary knowledge. This is true for Pseudo-Thomas in the sense that these operations develop our intellectual awareness of its own possessions, rather than adding anything to them; it is true for Ockham in the quite different sense that propositions and arguments are objects of knowledge distinct from the individual things which are known primarily, even though the terms of a scientific proposition are used to stand for these things. The distinction between first and second intentions is crucial for both Pseudo-Thomas and Ockham. For Ockham, it serves as a means of drawing an absolute distinction between three levels: things which are not signs, the propositions of real sciences, and the propositions of logic. For Pseudo-Thomas, the distinction of intentions is important as a means for reducing the intentional to the real, since first intentions are real beings. For both authors, there is a factor given us independently of any act of the intellect which determines the truth of our propositions. For Pseudo-Thomas, this factor is the nature of the thing; for Ockham, it is the natural signification of the concept. Finally, both Pseudo-Thomas and Ockham posit an immediate intellectual intuition of individual things outside knowledge. For Pseudo-Thomas, this intuition is necessary in order that the form in the intellect can be compared with the form in the thing; for Ockham, it is necessary as the basis on which all other intellectual knowledge proceeds.

Comparing the Summary of the Entire Aristotelian Logic of Pseudo-Thomas with Ockham's Summary of Logic, one feels that there is more resemblance between the two works with respect to logical theory than the mere similarity of names. The two authors are in a single dispute. They are on opposite sides of the argument, in direct opposition to each other. Precisely for that reason, there is some community of problems and principles; however, from their common problems and principles, they come to exactly opposed conclusions.

The Logic of St. Thomas Aquinas

By comparison with the clear positions of Pseudo-Thomas and Ockham on the nature and purpose of logic, the position of Aquinas must seem vague and confused. At times, Aquinas calls logic an art; at other times, he calls it a science. At times, he says it is speculative in a way; at other times, he says it is methodological. He states clearly that logic is concerned with the operations of reason; however, he holds that these operations belong to the subject matter of a natural science, psychology, and he divides logic from all natural sciences. He states cryptically that logic is concerned with entities of reason and the intentions which reason introduces. He makes comparisons which place logic and metaphysics in close relations; however, he divides the two sharply, saying that logic concerns the modes of predicating, not the existence of things.

We might suppose that the difficulty lies in the fact that Aquinas never wrote any complete logical treatise of his own.[1] This supposition certainly has some validity. However, although he would have stated a clearer and more accessible position had he treated logic extensively and for its own sake, we cannot assume that this factor is a sufficient reason for the complexity and apparent confusion of Aquinas' statements. If the clearly-opposed alternatives offered us by Pseudo-Thomas and Ockham are not the only possible positions concerning the nature and purpose of logic, then these two will not be contradictories, but contraries. The community which I have indicated between the two positions lends plausability to this hypothesis. In this case, it is possible that Aquinas offers us a third alternative, a position opposed to the first two in a way other than that in which they oppose each other.

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[1]See: I. T. Eschmann, O. P., "A Catalogue of St. Thomas' Works," in Etienne Gilson, The Christian Philosophy of St. Thomas Aquinas (New York; Random House, 1956), pp. 381-437. Items 28 and 29 are commentaries on Aristotle's On Interpretation and Posterior analytics; items 49 and 50 are "De fallaciis ad quosdem nobiles artistas" and "De propositionibus modalibus," which seem to be genuine, but very youthful, works; item 93 is "De natura generis," which is among a group of works whose authenticity long has been in debate; and item 97 is "De demonstratione," about the authenticity of which authorities are divided. Aquinas' specifically logical works, then, are either commentaries, very youthful works, or works of doubtful authenticity, moreover, none of these is a complete treatise.

Reading the treatises of Pseudo-Thomas and Ockham, and then searching the works of Aquinas for a comparable position concerning the nature of logic, I was struck by the fact that it is hard to distinguish Aquinas from the others, although it is easy to see the difference between them. It is not surprising that the author of the Summary of the Entire Aristotelian Logic was mistaken for Aquinas; I can sympathize with those who made the erroneous attribution, since many of Pseudo-Thomas' statements are reproduced almost literally from passages in Aquinas' authentic works.[1] On the other hand, it is not surprising that some interpreters of Ockham note similarities between the doctrine of Aquinas and that of Ockham, even while drawing a clear distinction between the logic of Ockham and a logic such as Pseudo-Thomas'.[2]

I do not believe that Aquinas was merely confused about the nature and purpose of logic; in any case, that hypothesis would be a poor basis to use in investigating his position. I think there is sufficient evidence in the works of Aquinas to show that he held a distinctive, consistent, and subtle position on this matter; moreover, I think that his position offers an interesting and important alternative to the contrary opposition between the positions of Pseudo-Thomas and Ockham. The apparent lack of clarity and consistency in Aquinas' statements can be explained if, from his point of view, the argument concerning whether logic is a science or an art, is a false question because of the incorrect assumption that it must be one or the other.

First, I shall examine some of the apparently conflicting statements which Aquinas makes about logic, and show how he qualifies these statements.

In his introductions to both of his commentaries on logical works of Aristotle, Aquinas tells us that logic is a science.[3] In at least two places, he refers logic to the speculative intellect, pointing out that the works of logic belong to speculative reason and that logic is instru-

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[1] Cf. Wild, loc. cit.

[2] Cf. Moody, op. cit., pp. 67 and 188 on Pseudo-Thomas; pp. 3, 7-10, 13-14, 25, 50-51, 83-89, 92, 198, 208, 229, 301, and 306-307 on Aquinas.

[3] In Post. anal., I, Proem.; In Peri herm., I, Proem.

mental to the speculative sciences.[1] Again, he says that logic is reduced to the speculative intellect, because its function is in speculation.[2] Considering these evidences by themselves, it is easy to understand how the conclusion might be drawn that Aquinas considers logic a speculative science.

However, in the Proemia to his commentaries on logical works of Aristotle, Aquinas also considers logic an art. In contrast with the actions of brutes, which are directed to their ends by instinct, the actions of men are directed by reason. This direction even is of the very act of reason itself; the directive art in this instance is logic.[3] Like other arts, logic is concerned with operations: the three operations of reason.[4] Logic is a useful art; the logical disciplines are not sought for their own sake, but as an introduction to the other arts.[5] Speculative sciences are not sought for any utility, but for their own sake; logic is not sought for its own sake, but for some utility.[6] Against the notion that logic is in some way speculative, Aquinas holds that it is methodological, for it teaches the modus procedendi of all the sciences.[7]

Aquinas says repeatedly that logic considers the operations of reason.[8] Logic is rational, not only because it proceeds according to reason, as do all of the sciences, but because it is concerned with the very act of reason as with its proper matter.[9] The division and ordering of the three operations of reason belongs to the logical consideration.[10]

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[1] In de Trin., qu. 5, art. 1, ad 2; Sum. theol., II-II, qu. 47, art. 2, ad 3 and qu. 51, art. 2, ad 3.

[2] In de Trin., qu. 5, art. 1, ad 2.

[3] In Post anal., I, Proem.; cf. In Meta., I, lect. iii; In de Trin., qu. 5, art. 1, ad 2.

[4] In Peri herm., I, Proem.

[5] In Meta., I, lect. iii; In de Trin., qu. 5, art. 1, ad 2.

[6] In Meta., I, lect. i.

[7] Ibid.; In de Trin., qu. 6, art. 1, qu'la. 2, ad 3; In Eth., VI, lect. vii.

[8] In Eth., I, lect. i; In Peri herm., I, Proem.; In Post. anal., I, lect. xx and Proem.

[9] In Post. anal., I, Proem.

[10] Ibid.

Logic, then, is not simply speculative, but only in some way, for it is sought for some use.[1] Yet logic cannot be called "practical," in the sense in which practical is divided against speculative knowledge, since practical knowledge in this sense is ordered to a work outside the intellect,[2] while the works of logic are referred to the speculative intellect.[3] Moreover, the concern of logic with the operations of reason is not unqualified, since these operations properly fall within the subject matter of psychology.[4]

In the introduction to his commentary on Aristotle's Ethics, there is a key text in which Aquinas distinguishes a fourfold order which reason considers. To know order is the proper province of reason, for even the sense powers know some absolute things. Since the consideration of reason is perfected by habits, among which are the sciences, the sciences are divided according to the fourfold order which reason considers. There is an order which reason in no way makes, but only considers; this belongs to the natural sciences, including metaphysics. There is an order which reason, by its consideration, makes in the operations of the will; the consideration of this order belongs to moral philosophy. There is an order which reason, by its consideration, makes in external things of which man is the cause; the consideration of such products belongs to the arts. However, there is another order which reason, by its consideration, makes in its own acts—for example, when it orders concepts and signs of concepts to each other; the consideration of this order belongs to rational philosophy.[5]

Logic, then, neither is theoretical, nor practical, nor productive. It is not theoretical, for the order which it considers is not independent of that consideration. Consequently, Aquinas can say that logic, as a kind of knowledge, is sought not for its own sake, as speculative science is, but for the sake of some use. Moreover, the division of the speculative sciences into physics, mathematics, and metaphysics is complete;

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[1] In Meta., I, lect. i. [2] Sum. theol., I-II, qu. 57, art. 1, ad 1.
[3] Ibid., II-II, qu. 47, art. 2, ad 3.
[4] In Peri herm., I, lect. ii; In de Anima, I, lect. i-ii; In Meta., IV, lect. iv.
[5] In Eth., I, lect. i.

there is no place in this kind of science for logic.[1] On the other hand, logic is not practical, for the practical sciences are divided between the active and the productive—that is, the moral sciences and the mechanical arts.[2] Like the moral sciences, logic is not a mechanical art.[3] However, the principle of the moral sciences is choice;[4] therefore, logic cannot be assimilated to them, since the practical intellect always aims at a good which is outside itself,[5] while the determination of the speculative intellect, to which logic is ordered, is distinguished from acts over which the will has control.[6]

"Science" often is used by Aquinas in a very broad sense, for even the division he gives in his introduction to the Ethics is a division of science. For this reason, we must not forget the qualification he makes when he calls logic "rational science" or "rational philosophy."[7] When Aquinas says that logic is speculative by reduction, as an instrument ministering to speculation, we must understand that he means it properly is not speculative, but is related to speculative knowledge.[8]

Aquinas also uses the word "art" in an extended sense when he applies it to logic.[9] Logic is a liberal art,[10] but the liberal arts really are sciences whose work is immediately of reason; only those arts are called "liberal" which are ordered to scientific knowledge, while arts ordered to some utility are called "mechanical" or "servile."[11] Strictly

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[1] In Meta., VI, lect. i; XI, lect. vii; In de Trin., qu. 5, art. 1, c., ad 2, and ad 3.

[2] In Meta., VI, lect. i; XI, lect. vii. [3] In Meta., XI, lect. ii.

[4] In Meta., VI, lect. i. [5] Sum. theol., I-II, qu. 3, art. 5, ad 2.

[6] In Sent., III, dist. 23, qu. 2, art. 2, qu'la 3, c.; De ver., qu. 14, art. 1, c.; of course, in some of its acts, the intellect is moved by the will to act, even in the case of scientific knowledge: Ibid., art. 2, c.

[7] In Post. anal., I, Proem.; In Peri herm., I, Proem.; In Eth., I, lect. i.

[8] In de Trin., qu. 5, art. 1, ad 2. We commonly use the notion of "reduction" to indicate that one thing is another when the identity is not obvious; Aquinas uses the notion of "reduction" when one thing is not another, but is related to it, even by a relation of contrary or contradictory opposition; see: In Sent., I, qu. 1, art. 1, ad 3.

[9] Sum. theol., I-II, qu. 57, art. 3, ad 3; qu. 134, art. 2, c.

[10] In de Trin., qu. 5, art. 1, ad 3. [11] In Meta., I, lect. iii.

speaking, reason has no product.[1] However, by analogy to the operations which are outside the intellect, in which there is an operation and something produced through the operation, there is an act of reason and something constituted through it; to this extent, the notion of art can be used with reference to logic.[2] In this way, certain sciences can be called "arts," for they have something analogously like a product; nevertheless, although these sciences are more noble than other arts, the notion of art does not apply so properly to them.[3]

We have seen that logic is concerned with the operations of reason. Yet the operations of reason belong to the subject matter of psychology, and his fourfold division shows that Aquinas did not consider logic subordinate to psychology, for then he would have included it in the category of natural science. From this it follows that the psychological operations of reason are not the proper subject matter of logic, although logic is concerned with these operations as with its proper matter; rather, it is the order which reason introduces into its acts by its consideration—an order which belongs to these acts by their intentional terminations, not by their psychological principles—which logic properly considers.[4]

What, then, is logic according to Aquinas? What does it consider?

> Being is twofold: being of nature and being of reason. "Being of reason" properly is said of those intentions which reason introduces in the things considered—for example, the intentions of genus, species, and the like. Indeed, these are not found in the nature of things, but they follow the consideration of reason. The subject of

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[1] Cont. gent., III, chap. xxv; In Eth., VI, lect. ii.

[2] Sum. theol., I-II, qu. 90, art. 1, ad 2; II-II, qu. 47, art. 2, ad 3.

[3] In de Trin., qu. 5, art. 1, ad 3; Sum. theol., I-II, qu. 57, art. 3, ad 3. In the broadest sense, the word "art" can be applied even to purely speculative sciences; see: In Meta., I, lect. i; In de Trin., qu. 5, art. 1, ad 4.

[4] The basic text concerning the non-psychic entity of intention is Cont. gent., IV, chap. xi. Intentions are constituted by each act of the intellect: Sum. theol., I-II, qu. 90, art. 1, ad 2; De Pot., qu. 8, art. 1, c.; De spirit. creat., art. 9, ad 6; De ver., qu. 4, art. 2, c. The intentions which logic considers follow the mode of understanding: De pot., qu. 7, art. 9, c.; In Sent., I, dist. 2, qu. 1, art. 3, c.; Sum. theol., I, qu. 76, art. 3, ad 4; In Meta., IV, lect. iv.

logic properly is things of this sort—that is, beings of reason.[1] Logic is a consideration of intentions. It considers intentions and nothing else;[2] no other science considers them.[3] These intentions are divided against beings of nature. "Being of nature" here, we must remember, is to be taken very broadly, since it includes the objects of all theoretical and practical sciences, and all the objects of the arts. Perhaps, then, a suitable translation for "ens naturae" would be "real being." These intentions also are identified with relations of reason, which are divided against real relations.[4]

The expression, "which reason introduces in the things considered," which Aquinas uses to limit the meaning of "intentions," is particularly interesting because of the use of the word "adinvenit," which I have translated as "introduces." "Adinvenit" does not mean "finds," for in the very next sentence he explicitly denies that these intentions are found in reality. On the other hand, it cannot mean "makes," for reason properly has no product.[5] "Adinvenit" indicates, in one word, the middle position which Aquinas developed between logic as a science and logic as an art, for the word refers to an introduction of an intentional entity, an introduction which can be reduced neither to the finding of a given entity nor to the making of a real product. "Adinvenit" refers to the forming by the intellect of a determination wholly immanent to itself; consequently, Aquinas uses the word with respect to the following: intentions,[6] certain

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[1] In Meta., IV, lect. iv: ". . . ens est duplex: ens scilicet rationis et ens naturae. Ens autem rationis dicitur proprie de illis intentionibus, quas ratio adinvenit in rebus consideratis; sicut intentio generis, speciei et similium, quae quidem non inveniuntur in rerum natura, sed considerationem rationis consequuntur. Et huiusmodi, scilicet ens rationis, est proprie subiectum logicae."

[2] In Sent., I, dist. 19, qu. 5, art. 2, ad 1; In de Trin., qu. 6, art. 3.

[3] De pot., qu. 7, art. 11, c.; In de An., III, lect. 8.

[4] Sum. theol., I, qu. 13, art. 7, c.; qu. 28, art. 1, c.; cf. De pot., qu. 7, art. 11, c.

[5] Cont. gent., III, chap. xxv; In Eth., VI, lect. ii.

[6] In Sent., I, dist. 2, qu. 1, art. 1, c.; dist. 25, qu. 1, art. 1, qu'la 1, c.

relations and orders developed by the intellect itself,[1] names and words,[2] and the composition of a proposition.[3]

The intentions which logic considers follow the determination of understanding; they themselves are not understood primarily, but only in a secondary way.[4] Whenever we understand anything, we must understand real being;[5] intentions are understood only inasmuch as we understand ourselves to understand.[6] Logic is not concerned with real beings; consequently, it is not a knowledge in the full and primary sense. Intentions are not real beings; they are only immanent terminations of acts of the intellect, which we consider as quasi-characteristics of things known insofar as they are known.[7] It follows that these intentions cannot be attributed to the realities known.

Sometimes Aquinas says that logic considers, as its subject matter, the predicate, the proposition, and the syllogism, and he calls these intentions.[8] On the other hand, he insists that logic is concerned with intentions which are relations of reason.[9] These two statements might seem inconsistent, since the former seems to establish absolute entities as logical objects, while the latter considers those objects to be merely relative. However, it seems to me that the apparent inconsistency can be resolved. The operations which logic orders—but not insofar as they are psychological—are considered as to their intelligible terminations in concepts, propositions, and arguments. These terminations are not real things; consequently, they are not to be considered as though they were substances to which relations would accrue as accidents.[10] It follows,

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[1] De pot., qu. 7, art. 11, c.

[2] Sum. theol., I, qu. 37, art. 1, c.; Cont. gent., I, chap. xxxv.

[3] In Sent., II, dist. 34, qu. 1, art. 1, c.; Sum. theol., I, qu. 3, art. 4, ad 2.

[4] De pot., qu. 7, art. 9, c.; In Sent., I, dist. 2, qu. 1, art. 3, c.; Sum. theol., I, qu. 76, art. 3, ad 4; In Meta., IV, lect. iv.

[5] Sum. theol., I, qu. 87, art. 3, c. [6] De pot., qu. 7, art. 9, c.

[7] De pot., qu. 7, art. 6, c.; In Meta., XI, lect. iii; De ente, chap. iii.

[8] In Post. anal., I, lect. xx. [9] De pot., qu. 7, art. 11, c.

[10] Only real being divides between substance and accident; see: De ente, chap. i.

therefore, that the operations of the intellect are the proper matter of logic, since they are what logic orders.[1] However, since sciences are properly distinguished by subject matters—that is, by the very orders which they consider, not by absolute things—logic has as its subject matter the predicate, the proposition, and the syllogism; these are the relations of reason which logic considers.

Aquinas' distinction between being of nature and being of reason is reflected by Pseudo-Thomas' distinction between real and intentional being. Aquinas maintains that "being of itself" is ambiguous, either signifying what is divided into the ten categories—in this sense, it posits something in reality—or signifying anything which can be the subject of a true proposition—in this sense, it also can indicate what only is understood.[2] Similarly, Pseudo-Thomas divides being in the soul between real being, which can be possessed by something, and intentional being, which belongs to nothing as a subject.[3] However, there are important differences. For Aquinas, real beings have their whole actuality as real beings by existence[4] and intentional beings are only insofar as they are understood.[5] For Pseudo-Thomas, real beings are real and somewhat actual by their essential being; they exist by the addition of a being of actual existence which accrues to them in individuals.[6] For him, second intentions are intentional, because they are objects of thought which cannot be possessed either by the intellect or by matter. Categories, on the other hand, can be taken in two ways—either as intentions or as real beings.[7] Consequently, Pseudo-Thomas distinguishes between being of essence and being of actual existence as between two diverse realities, and he opposes them to each other inasmuch as essential being belongs properly to the nature, while existential being belongs properly to the individual.[8] Aquinas, however, neither treated essence and existence as diverse reali-

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[1] *In Post. anal.*, I, Proem. [2] *De ente*, chap. i.

[3] *S. t. l.*, tr. II, chap. i.

[4] *Sum. theol.*, I, qu. 3, art. 4, c.; *De pot.*, qu. 7, art. 2, ad 9; qu. 3, art. 7, c.; cf. *Sum. theol.*, I, qu. 5, art. 4, c.; *In Sent.*, I, dist. 33, qu. 1, ad 1; *Cont. gent.*, II, chaps. lii and liv.

[5] *Cont. gent.*, IV, chap. xi. [6] *S. t. l.*, tr. II, chaps. i-ii.

[7] *Ibid.*, chap. i. [8] *Ibid.*, chap. ii.

ties, nor did he oppose them as nature and individual.[1]

Moreover, Pseudo-Thomas distinguishes between first intentions, which are real beings, and second intentions, which are intentional beings, since he thinks that the nature is a thing posited in the intellect which becomes an object when the intellect reflects upon it.[2] Aquinas, however, does not consider the immanent term of the intellect to be a real being.[3] Aquinas does distinguish between things primarily and secondarily understood, for real things are understood primarily, while intentions are understood only secondarily.[4] The real sciences, including metaphysics, are concerned with things first understood; logic is concerned with the intentions which are understood only secondarily.[5] Strictly speaking, there are no first and second intentions,[6] although he does distinguish between linguistic terms of first and second imposition or intention.[7]

Aquinas tells us that logic and metaphysics have a certain affinity because of their absolute community; the subjects of both are absolutely general.[8] Metaphysics is concerned with universal truth,[9] and logic precisely is concerned with the being and non-being which signify the truth and falsity of propositions.[10] From this statement, it might seem that Aquinas considers logic a part of metaphysics, but he distinguishes the

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[1] De ente, chap. iv.

[2] S. t. l., tr. I, chap. i.

[3] Cont. gent., IV, chap. xi.

[4] Ibid.; De pot., qu. 7, art. 9, c.

[5] In Meta., IV, lect. iv.

[6] Many references to "first and second intentions" in Aquinas' works may be found in secondary sources, but I have found no place where he makes such a distinction. Perhaps the nearest he comes to it is when he says that intellective reason collates universal intentions (E. g. Sum. theol., I, qu. 76, art. 4, c.); even here, however, he can be understood to mean intentions as such, not the intelligible aspects themselves, since the contrast is with the objects of the cogitative, not with the expressed species simply imagined.

[7] In Sent., I, dist. 2, qu. 1, art. 3, c.; dist. 26, qu. 1, art. 1, ad 3; dist. 33, qu. un., art. 1, ad 3. Names of first imposition or intention signify things; names of second imposition or intention signify intentions. Even this concession to current terminology seems to have been abandoned by Aquinas, for I have found it in none of his later works.

[8] In Meta., IV, lect. iv; VII, lect. iii; In post. anal., I, lect. xx.

[9] In Meta., II, lect. i; Cont. gent., I, chap. i.

[10] In Meta., IV, lect. xvii; VI, lect. iv.

two, since logic considers beings of reason, intentions, things as in reason, an order of the acts of reason, mere intentions, or the modes of predicating; metaphysics properly is not concerned with any of these.[1] Everything which is, which metaphysics considers as being, in a way falls under the view of logic, for insofar as anything is understood, it is subjected to the intellectual operations in which intentions are introduced.[2] In knowing anything, we come to know the logical object in a way, not because the logical object is confused with the realities primarily known, but because the terminations immanent to the process of knowledge are known secondarily whenever any thing is known primarily.[3] The community of logic and metaphysics, therefore, is not a community in dealing with ultimate principles of scientific knowledge, nor is it a community in dealing with signs which may be fabricated into propositions to be known scientifically; rather, it is a community of extension, based on the fact that metaphysics considers everything and logic considers the intentions the intellect introduces in knowing anything.

Pseudo-Thomas' reduction of logic to metaphysics, consequently, is not well-founded in Aquinas, for he makes a clear distinction between the two fields. Moreover, whereas Pseudo-Thomas considers it necessary to divide real being in order to attain a logical knowledge of the categories; Aquinas interprets Aristotle's treatment in the metaphysics as an instance of an opposite procedure--logical distinctions are used in order to illuminate metaphysical ones, although the metaphysical distinctions are considered to be prior in themselves.[4] This interpretation is by no means an isolated instance in Aquinas' works, for he teaches explicitly that it is appropriate for metaphysics to use logical propositions as principles in its own considerations, although other sciences would err by proceeding in this manner.[5] However, since logic does not provide the metaphysician with starting-points by instructing him concerning the ex-

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[1] In Meta., IV, lect. iv; VII, lect. xiii and xvii; In Post. anal., I, lect. xx; In Eth., I, lect. i; In Sent., I, dist. 19, qu. 5, art. 2, ad 1; In de Trin., qu. 6, art. 3, c.

[2] In Meta., IV, lect. iv.

[3] De pot., qu. 7, art. 9, c.; Cont. gent., IV, chap. xi.

[4] In Meta., V, lect. ix. [5] In de Trin., qu. 6, art. 1, qu'la. 1, c.

istence of things, but only by showing him the modes of predication, its assistance to the metaphysician does not project it beyond its proper limits.

"The logician considers the mode of predicating, not the existence of the thing," is an apt translation of Aquinas' statement, "Logicus enim considerat modum praedicandi, et non existentiam rei."[1] "Modus" might be translated as "mode," "mood," "way," "manner," or "method;" all of these are suitable in some contexts. However, another translation is "measure," and the notion of measure always is involved somehow in Aquinas' use of "modus."[2] Obviously, in reference to modes of predicating, Aquinas does not mean to indicate a quantitative measuring. The notion must be closer to that of a determinant, a standard, or a limit.

This notion, taken seriously, can help greatly to clarify Aquinas' view of logic. Aquinas tells us, on the one hand, that logic is concerned with the intentions which terminate the acts of the intellect--these are relative to a complete knowledge of the thing. He tells us, on the other hand, that logic is concerned with the mode--which we must understand as a determinant, standard, or limit--of predicating. Now, our knowledge is not completed in simple understanding, but in composition and division, and in reasoning.[3] It follows that logic considers intentions insofar as they are introduced into predication, where they function as limits, standards, or determinants of the positing which occurs in predicating.[4] This

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[1] In Meta., VII, lect. xvii. [2] Sum. theol., I-II, qu. 49, art. 2, c.

[3] Sum. theol., I, qu. 85, art. 5, c. Of course, reasoning also terminates in a predication.

[4] Aquinas sometimes calls the proposition a "positio"--that is, a positing, e. g.: "Omnis enim positio absoluta aliquid in rerum natura existens significat." (De ver., qu. 21, art. 1, c.) The notion of positing always is involved in predicating, however, since truth is the completion of the intellect (Sum. theol., I, qu. 16, art. 2, c.) and truth is known when the thing is judged to be--"ita se habere"--as it is. Therefore, Aquinas says that logic considers the predicate (rather than concept), proposition, and syllogism. (In Post. anal., I, lect. xx.) Moreover, the very being of intentions is in being understood (Cont. gent., IV, chap. xi.); intentions are not understood except when the intellect reflects upon itself, knowing itself to know (De pot., qu. 7, art. 9, c.); this reflexive act is that in which the intellect judges and forms a proposition (De ver., qu. 1, art. 9); consequently, intentions as such only occur in the second act of the intellect.

determination is not in the thing known, but only in the process of knowledge; it limits our positing to what we actually know of the thing. On the other hand, this determination is not something made through knowledge, for it is the limit of knowledge itself. As a real measurement would establish a real relation and constitute a real order, so the modes of predicating establish intentional relations and constitute an intentional order. Consequently, logic considers an order which reason, by its consideration, makes in its own acts—for example, when it orders concepts to each other.[1]

This interpretation of Aquinas accounts for his notion of logic as a unified discipline having distinct parts.[2] In each part of logic, a distinct set of standards or limits of predication is considered; these are distinguished inasmuch as they derive from terminations of the different operations of the intellect. Thus, Aquinas calls the categories "modes of predicating;"[3] he speaks of various divisions of propositions as different modes in which they can be varied;[4] and he always treats the principles and middle terms of demonstrations as determinants and limits of the demonstrated propositions, although he does not call them "modes." The interpretation also agrees with the distinction of syllogistic modes, since the modes of the syllogism are definite arrangements of propositions of definite forms which measure the truth of deduced conclusions. Logic, then, is one discipline, although its parts are distinct, since the various acts of the intellect do not provide modes for predication in the same way. The intellect perfects its work in composition and division, forming the proposition, for there it attains truth, and it is with truth that logic is concerned.[5] Consequently, logic is unified in that each act of the intellect provides some measure or limit for the predication in which truth is known, but it is divided according to the diversity of those measures.

One consequence of this unity of logic is that Aquinas makes no

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[1] In Eth., I, lect. i.
[2] In Peri herm., I, Prooem; In Post. anal., I, Prooem.
[3] In Meta., V, lect. ix. [4] In Peri herm., I, lect. ix.
[5] In Meta., IV, lect. xvii; VI, lect. iv.

sharp break between the treatise on the categories and the rest of logic.[1] Although the modes which logic considers exercise their function of determination and limitation in the second act of the intellect, these modes themselves are the intentional terminations of all the acts of the intellect, considered insofar as they bear upon the knowledge of the thing achieved by judgment and expressed in the proposition. Aquinas does not portray the intellect as an artist, making a construct from materials naturally supplied to it. Nor does he view the intellect as an eager recipient, unwrapping a package reality has given it, and exposing the contents to its full view.

Thus, for Pseudo-Thomas, the treatises on the predicables and categories deal with things understood and the remaining treatises are distinguished by treating modes of signifying.[2] For Aquinas, on the contrary, all parts of logic are concerned with language, but just to the extent that linguistic expressions signify logical intentions. In fact, the way in which language signifies with simple words must be considered in all three parts of logic, since they signify simple insights, or parts of a proposition, or parts of an argument.[3] Properly, however, logic is not concerned with modes of signification, since the consideration of these belongs to grammar.[4] These modes of signifying, considered by grammar, must not be confused with the modes of predication, considered by logic, for the former are lingnistic, while the latter are intentional.[5]

If these considerations are sufficient to show that Aquinas thinks logic to be a consideration of the intentional terminations of intellectual operations insofar as they determine and limit predication; I must explain why such a consideration is necessary and how it can proceed.

Aquinas does not hold that the first act of the intellect attains

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[1] In Post. anal., I, Proem; In Peri herm., I, Proem.

[2] S. t. l., tr. VI, chap. xviii. [3] In Peri herm., I, lect. i.

[4] In Sent., I, dist. 22, qu. 1, art. 1, ad 3; he explicitly points out that grammar and logic differ.

[5] In reading Aquinas, remember that he considers "sign" properly to apply only to sensible things (Sum. theol., III, qu. 60, art. 4, ad 1) and seldom, and only in an extended sense, applies it to cognition (De ver., qu. 9, art. 4, ad 4).

to any absolute metaphysical principle. The intellect primarily understands real things themselves. However, it does not understand them insofar as they are; rather, it understands only a limited intelligible aspect of them.[1] This intelligible aspect is identical with the thing known to the extent that the thing is known—that is, so far as it goes, what the understanding understands is the thing understood.[2] However, insofar as it is limited—it is in this aspect that it is an intention and mode of predicating—the intention terminating the first act of the intellect belongs solely to the intellect.[3] Consequently, what is understood in the first act of the intellect, considering the limitation of understanding, need not correspond to any thing, real principle, or part of a thing.[4] To attain the metaphysical roots of things, therefore, further operations of the intellect are a necessity.[5] In the second operation, composition and division, the existence of the thing, which is its basic actuality, is known.[6] In the third operation, the order of the thing to other things, in which its full perfection consists, is known.[7] For Aquinas, then, the three acts of the intellect constitute a continuous and single-minded process; for, proceeding from complete ignorance and tending to full comprehension, they gradually expand our knowledge of the same object. To the extent that we achieve truth, our cognitive process attains its goal.[8]

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[1] De pot., qu. 11, art. 5, c.; Cont. gent., I, chap. liii. I am translating "ratio" as "intelligible aspect." Aquinas sometimes calls this an "intentio," but it is not properly an intention insofar as it is the term of the first act of the intellect, but only insofar as it is relative and determinative in predication. Cf.: In Sent., I, dist. 2, qu. 1, art. 3, c.

[2] "The intellect in act and the thing understood in act are one," passim; e. g., Sum. theol., I, qu. 14, art. 2, c. The ratio is what is known of the thing which is known.

[3] De pot., qu. 11, art. 5, c.

[4] For this reason, Aquinas uses one phrase repeatedly: "differunt in ratione, idem in subiecto sunt"—that is, they are really the same thing, but are different intelligible aspects.

[5] Sum. theol., I, qu. 85, art. 5. [6] In de Trin., qu. 5, art. 3, c.

[7] In Eth., I, lect. 1; Cont. gent., I, chap. xlii.

[8] Cont. gent., I, chap. i. The human intellect requires an act to understand itself distinct from the act required to understand its primary objects—material things (Sum. theol., I, qu. 87, art. 3, c.). However, this reflex act also is an understanding of the first object (Ibid.,

However, the intellect has no immediate intuition of individual things existing outside it.[1] It is impossible then, that the intellect should determine truth by looking outside what it knows, insofar as it knows, for factors to determine truth. Therefore, the determinative factors must be derived within the terminations attained by the acts of the intellect themselves; these determinative factors are precisely the intentions which are standards, determinants, or limits of predication. The necessity for logic, consequently, is that we must order all of our partial and relative cognitive achievements to the single goal of knowledge: attainment to the truth of things. This ordering is necessary precisely because these achievements are partial, relative to fuller knowledge and to the being of things.

For this reason, Aquinas' logic, unlike Pseudo-Thomas', cannot proceed by a reduction of logical entities to metaphysical principles. Logic does not proceed by reflection, for Aquinas, since knowledge really is a progression of the knower toward his objective. On the other hand, Aquinas does not view logic as an art regulating the construction-work in the intellect, since he does not consider the first act of knowledge to be a grasping of the things which are metaphysically absolute in a single psychological sign; unlike Ockham's first intention, Aquinas' ratio merely is an intelligible aspect understood of things, not an entity in the soul absolutely signifying things, which can be used as a building-block to compose objects for ulterior acts of knowledge. For these reasons, Aquinas does not establish a sharp break between the categories and the other parts of logic and he does not distinguish between first and second intentions.

Aquinas does not explain precisely how logic should proceed. Clearly, it cannot proceed logically, as the primary modes of knowledge do, for

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ad 2); as a matter of fact, it is the act through which truth becomes known (De ver., qu. 1, art. 9, c.). Consequently, there is not a second process of knowledge which is reflex, but the process of knowing things primarily-known does include a second act of knowledge.

[1] Sum. theol., I, qu. 85 and qu. 86, art. 1. We know singular things properly by experience; we understand them as singulars only inasmuch as in understanding them, we become aware of the experiential source of our understanding.

the objects of logic are known only secondarily in knowing something else. Logical entities have no definite essences of their own;[1] hence, there can be no understanding of them by themselves. Strictly speaking, logic cannot be a science. On the other hand, there is no material and no product within the intellect; hence, there can be no regulation with respect to intentions. Strictly speaking, logic cannot be an art.

Aquinas says that the order which logic considers is one which reason, by considering, makes in its own act.[2] However, logical structure is not considered reflexively in the use of logic; a syllogism cannot itself become a premise in itself.[3] From this point of view, logical structure is more aptly considered by analogy to regulation.[4] On the other hand, Aquinas holds that there is no applied logic in a demonstrative science distinct from the science itself.[5] It seems to follow that logical structure is considered more aptly by analogy to real structure.

There is one way of resolving this problem; although I have found no statements in Aquinas directly supporting it, it agrees with his requirements concerning the nature of logic and the necessity for it. I think Aquinas' logic must proceed by a shift of attention in a cognitive process which does not cease being concerned with something understood primarily. By using as objects of primary knowledge either examples uninteresting and insignificant in themselves or symbolic constructs, representing the very logical structure under consideration, it is possible to attend mainly to the modes of predicating. It is unnecessary, then, that these modes be suited to be objects of distinct scientific or artistic consideration. By contrasting the alternatives in each set of modes of predicating with each other, their differences can be known distinctly. Practice of this discipline, in cases in which the knowledge of the primary object is easy, establishes a constant habit of taking logical distinctions into account. This explanation is likely an over-simplication; nevertheless, something similar to this procedure seems necessary in Aquinas' logic, since the intentions are understood only secondarily.

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[1] De ente, chap. i-iii. [2] In Eth., I, lect. i.
[3] In Post. anal., II, lect. v. [4] Ibid.
[5] In Meta., IV, lect. iv. In non-demonstrative knowledge propositions of logic may be used heuristically; cf. In Post. anal., I, lect. xx.

In sum, for Aquinas, logic is neither a science nor an art. It is presupposed by the study of other sciences and it aids them as an instrument, but it does not consider the objects of other sciences. It neither reduces sciences to more ultimate principles, nor constructs objects to be known by them. Logical reflection must be carried on in a special way if it is not to fall into error; it offers a method of proceeding in sciences, by itself considering the order of the intellect's acts. In offering this method, logic does a necessary work, since the intentional relations or modes of predication which logic considers constitute an order which only occurs insofar as it is considered. Human reason, like other human powers, is not directed by instinct, but by the act of reason itself.

Conclusions

I have examined three distinct positions with respect to the nature and purpose of logic; these three positions are examples of three types of discipline or study that logic can be. For Pseudo-Thomas, logic is a reflexive science of scientific knowledge; it reduces the elements of logical subject matter to prior metaphysical and epistemological principles by a reflexive analysis of the content and structure of scientific knowledge itself. In performing this reduction, logic meets the criteria which it itself discovers for scientific knowledge; therefore, it is self-applicable not only in its structure, but even in its content. For Ockham, logic is an art which directs the construction of complex signs, using simple signs given by nature as its material. Among the complexes whose construction logic regulates are the demonstrated propositions which are direct objects of scientific knowledge—although insofar as the elements of such constructs are used to stand for the things they signify, real sciences are of real things. At least to the extent that logic is concerned with scientific propositions and arguments, it must be irreflexive, since it is itself an art whose rules are composed of second intentions used to stand for first intentions. According to Aquinas, logic is a secondary or concomitant knowledge of the order of the operations which constitute a process of direct knowledge—or, perhaps it would be better to say simply, "the process of knowledge," since there is no exclusively-logical process of knowing. Logic limits our assertions with respect to an

object primarily known, by introducing into the positing of the object the determinants or limits from each of the relative and incomplete terminations of cognitive acts. Directed to modifying the procedure of scientific knowledge, logic neither reflexively analyzes it not irreflexively constructs it, but maintains in its view the intentional relations in the scientific process without establishing a distinct process of scientific or artistic knowledge.

The positions of Pseudo-Thomas and of Ockham both require a distinction between first and second intentions; the position of Aquinas does not require such a distinction. For Pseudo-Thomas, the distinction is necessary because he must separate the logical entities, which by themselves are mere objects of knowledge, from the natures to which these logical entities accrue in the intellect. By making this separation, he is able to reduce the term of the primary process of scientific knowledge, which includes the natures with intentions inasmuch as the object is an object known, to the intellectually-possessed, real contents which are natures of things themselves. The first intention of Pseudo-Thomas, being both a real entity and an intentional term, can mediate between mere intentional entities and real being. For Ockham, the distinction between first and second intentions is necessary because he must separate signs of signs, which are acts knowing acts of knowledge, precisely insofar as they are acts of knowledge, from the primary signs, which are acts knowing real things. By making this separation, he is able to exclude confusions between real beings and signs, and between real sciences and logic. At the same time, he provides for the possibility of using signs—without them ceasing to be signs—to stand for themselves rather than for the things they signify; thus, Ockham can form logical rules which can be applied in regulating operations with respect to the signs which logical signs signify. Aquinas does require a distinction between real beings and intentions, because he must separate the thing itself from the relative terminations of acts of the intellect knowing the thing. However, he does not require a distinction between first and second intentions, for he does not allow the reality of the content understood insofar as it is understood, nor does he allow the distinction of the understanding in act from what is understood insofar as it is understood.

Underlying all three of these positions are certain suppositions with respect to the nature of things and the nature of knowledge. Pseudo-Thomas' position presupposes that there are natures present in things which the process of abstraction can separate from their spatial-temporal conditions in individual existents and posit in the receptive intellect. It also presupposes that these natures of themselves have a being by sharing in the universal nature of real being. Pseudo-Thomas' intellect immediately attains these objects which are metaphysically primary. However, it must become aware of its possessions by fully objectifying them and transforming their objectivity to possession by reducing scientific knowledge to its origin in possessed natures. Ockham's position presupposes that absolute individual things can cause in the receptive intellect a qualification which is a simple and direct act of primary knowledge. It also presupposes that these absolute individual things are metaphysically primary and that the cognitional quality itself is an individual real entity. Ockham's intellect immediately attains these objects, since the quality caused in it is a natural sign of its objects, and it also immediately attains these signs, because they themselves cause other signs which are knowledges of them. However, it must use these elements to stand for things in constructed complex signs to have objects suitable for scientific knowledge. Aquinas' position presupposes that things in themselves can be understood, that the intellect can understand, and that the act of understanding is a fulfillment of these possibilities. It also presupposes that the intellect, without immediately attaining a metaphysical principle in things, can include itself in its act of knowing things, so that it can know its objects as objects. Aquinas' intellect knows existence by positing the thing unconditionally. However, it must limit and determine that positing by the intentional relations which terminate the relative and partial acts within the cognitive process.

Each of the three logics, then, is intended to serve a quite distinct purpose. Pseudo-Thomas' logic reduces science to its origins; Ockham's logic constructs the propositions known by science; Aquinas' logic orders the operations of the process which achieves science. These distinctions have their effects in the different views of the conditions of attaining scientific knowledge by logic. Pseudo-Thomas sharply distinguishes between the treatises on the first operation of the intellect as

to things understood, and the other treatises which concern modes of signifying, since the others are not concerned with additional content known, but with explication and reduction. The determinants of truth are found not only in the nature present in the intellect, but also in the nature in its own being, for things apart from knowledge can be known by direct intuition in reflexive knowledge. Ockham sharply distinguishes between the study of the simple signs and the formation of rules for regulating the construction of significant complexes, since the latter are not concerned with things primarily known, but with a distinct set of complex significant objects. The determinants of truth are found not only in the natural signs which are caused by the things in the intellect, but also in the intuitively known individual things themselves, for the intuition of individuals is the point of departure for the whole process of knowledge. Aquinas does not sharply distinguish between the various parts of logic, since each act of the intellect terminates in an intention which serves as a determinant or limit of the complete knowledge of the thing known. The determinants of truth are found in these limits themselves, since there is no intuitive knowledge of individual things, although the objectivity of the object is known inasmuch as the intellect, including itself in its knowing, posits the object in predication, according to the order it has introduced into its own act by its own consideration.

Of the three positions, Aquinas' is the most difficult to grasp; moreover, it is difficult to maintain oneself in his point of view. The reason for this difficulty is that Aquinas requires reflexivity within the process of knowledge—which always remains a primary knowledge—and considers that this reflexivity is not reflexive with respect to its object—that is, he does not grant intelligibility to logical entities in themselves. The reflexive procedure of Pseudo-Thomas' intellect, which is his logical science, is a retracing of the path of direct knowledge in order that the ultimate object achieved in direct knowledge be reduced to the possession from which it originated. The reflexive procedure of Ockham's intellect is really not reflexive at all—that is, it is not a self-grasping. Rather, primary cognition has real things as its objects; logical knowledge has primary cognitions as its objects. The propositions of real sciences are composed of the atomic primary cognitions; the rules of logic are composed of the atomic secondary cognitions. Thus, each act of know-

ing is distinct in itself and it has a distinct object to be known. The reflexive procedure of Aquinas' intellect is a self-inclusion in knowing the primary object; however, since the intellect in knowing the object is the object insofar as it is known, logical knowledge has no adequate object of its own. Consequently, logic merely orders the direct process of knowledge—which always must be concerned with a real object—by bringing the terminations of the relative and partial acts within that process to bear upon the objectification—that is, the positing—of the object known itself. Nevertheless, because the limit signified by "insofar as it is known" never belongs to the object itself, logical entities are distinguished irreducibly from real entities.

I do not think that these three positions exhaust the possibilities with respect to the nature and purpose of logic. I have considered only the relation of the study to its subject matter, for I think that this determinant constitutes the basic opposition among logics. However, if other determinants are considered, the variations can be multiplied indefinitely. Moreover, if logic cannot be at once a science of pre-existent objects, an art for constructing intentional products, and a concomitant knowledge of objects which the act of reason introduces; nevertheless, it also could be a consideration of objects constituted by deliberation and realized by choice—that is, logic also might deal with values. In this case, logic would have its place as an instrument of practice; it would take the form of an ability for making knowledge continuous with the operations in which the values of personalities and cultures are achieved. If logic is ordered to practical ends without being transformed into a non-cognitive ability, however, I do think the three alternatives exhaust the possibilities for its relation to its subject matter.

Moreover, although I have alluded to differences made by the three theories of the nature of logic in the three logics themselves, the analysis thus far has not shown sufficiently that these alternatives are not merely oppositions in the theory of logic which do not essentially alter the content of logic. In the remaining chapters, I shall try to show that the three theories of logic do make significant differences in the logics themselves; the method for showing this is to examine, in some detail, the three treatments of the categories, the proposition, and the demonstration.

To avoid misunderstandings, I must point out too that I do not think I have shown that one of the three positions is correct or adequate and the other two false or inadequate. Although my rhetoric reveals my view that the positions of Pseudo-Thomas and Ockham are unacceptable and that the position of Aquinas is correct, I do not assume that distinguishing the positions and showing the oppositions between them is a sufficient ground for judging them. Judgment is a further step to which the clarification of alternatives is only a necessary pre-condition; even though it is a most important, and often neglected, preliminary. I believe that the correctness of Aquinas' position can be shown, but I do not think that the considerations I am pursuing are sufficient to show it. The proof would be a difficult one. I think it would depend on the different views of reflexivity involved in the three positions; I think it would show, by negative proof, that only Aquinas' position can be dynamically self-consistent. However, I say this only to indicate what I am not doing in this dissertation.

Something concerning the relevance of my conclusions to the strange case of John of St. Thomas and to the oppositions in modern logic is in order at this point. Because I do not think I have proved anything more than that there are at least three possible positions which are basically opposed, I do not expect to rule out any of the positions I shall mention. Because there are many factors in a logical theory besides the one I am investigating, I do not expect to identify the positions I shall mention with those I have examined. Finally, because an extensive examination of a work is necessary in order to determine its theoretical position, I mean only to propose an agenda for further investigation.

With regard to John of St. Thomas, then, I think it would be worth investigating whether his position in relation to the oppositions in question is not on the side of Pseudo-Thomas, rather than on the side of Aquinas. With regard to modern logic, I think it would be worth investigating whether logic was not treated as a science in Russell's early work and as an art by at least some members of the Vienna Circle, while being treated as a secondary and concomitant study by Dewey.

John of St. Thomas makes a distinction between natural and artificial logic; the former is merely the intellect itself with its natural

knowledge, while the latter is the discipline of logic.[1] The latter he considers to be a knowledge properly distinct from the primary process of knowledge. This is evident from the fact that although he considers logic necessary for the perfect condition of all of the sciences,[2] he cannot grant that it is absolutely necessary for every act of scientific knowledge.[3] He cannot grant the absolute necessity of logic, primarily because he thinks that would involve a reflexive difficulty; at least the knowledge which generates the first demonstration of logic does not require logic.[4] From this argument, it is clear that John considers logic a knowledge subject to the same conditions as other sciences and arts—rather than considering it as I have understood Aquinas to do, for then he would not have had the difficulty about reflexion. Moreover, John's reference to demonstration seems to show that he considers logic more a science than an art.

This is confirmed by the next question John asks: "Whether logic is a true science and art?"[5] His conclusion is that logic is truly and properly a science, but that it is at the same time an art—that is, a liberal art.[6] His reason is that logic proves contraries to be incompatible from the principle of contradiction, it proves the validity of a syllogism in Darii from the dictum de omni, and "six hundred other such cases."[7] His reason for saying that logic is an art is that it fulfills the definition of an art by providing a correct plan for the direction of certain operations—the acts of the intellect—which of themselves can proceed either erroneously or rightly.[8]

Against his thesis that logic is a science, John proposes the argu-

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[1] Ioannis a Sancto Thomas, op. cit., I, $251^{b}48$-$252^{a}16$.

[2] Ibid., $254^{a}19$-$256^{a}9$. He refers to Aquinas for this point.

[3] Ibid., $253^{a}39$-$254^{b}18$ and $256^{a}10$-$^{b}10$. He refers to texts in Aristotle and Aquinas which seem against this point, and distinguishes between principal and instrumental cause—logic is an instrumental cause of other sciences—to remove the difficulty.

[4] Ibid., $253^{a}22$-$^{b}32$. [5] Ibid., $256^{b}15$-$259^{b}33$. [6] Ibid., $256^{a}36$-38.

[7] Ibid., $256^{b}39$-$257^{a}25$. He refers to passages in which Aquinas "openly calls logic a science."

[8] Ibid., $257^{a}26$-$^{b}37$. He refers ($256^{a}42$-$^{b}9$) to places in which Aquinas says it has a certain work such as forming a syllogism.

ment that it cannot be a science, for it is the mode and instrument of scientific knowledge.[1] John's solution is that logic is not itself an instrument insofar as it is a knowledge, but that it considers instruments of knowledge, and that logic is not instrumental with respect to the sciences, but with respect to the intellect itself—that is, the intellect uses logic for other sciences as a craftsman uses one knife to make another; therefore, logic and the other sciences need not differ in nature. Against his thesis John also proposes the argument that logic used heuristically seems the same as the study of logic, but a heuristic habit cannot be a science, since it educes only probable conclusions.[2] His solution is that the heuristic application is secondary and only derivative; it does not specify logic. Against his thesis John also proposes the argument that entities of reason cannot properly be the object of a strict scientific knowledge, since they are not knowable through themselves.[3] His response is that entities of reason have sufficient objective knowability and truth that they can be objects of a science, since they are founded in and necessarily connected with reality, although they do not have transcendental being and truth in themselves.

Against his thesis that logic is an art, John proposes the objection that arts are concerned with contingent matters and that logic is only an art by likeness.[4] His solution is that the contingency is with respect to the material on which the art operates, and that logic is an art by likeness with respect to its objects, but that it is strictly an art in itself.

John's next question is: "Whether the formal and adequate object of logic is a being of reason, which is a second intention?"[5] For John, a being of reason is something which exists only if it is considered by the

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[1] Ibid., $257^{b}41$-$258^{b}2$. He refers to passages in which Aquinas qualifies the notion of logic as a science.

[2] Ibid., $258^{b}3$-13 and 24-42. He refers to places in Aquinas which sustain the objection.

[3] Ibid., $258^{b}14$-23 and $258^{b}43$-$259^{a}7$.

[4] Ibid., $259^{a}8$-$^{b}33$. He refers to places in Aquinas which sustain the objection.

[5] Ibid., $259^{b}37$-40.

intellect; since things which are not, are considered after the manner of beings, they are called "beings of reason."[1] What is to be noticed here is that John thinks beings of reason are beings in their improper way because they are considered after the manner of being; for this reason, he classes fictions with beings of reason. By the "formal and adequate object of logic," John means that by reason of which everything that falls under the science is considered.[2]

He begins his reply by saying that two things are certain and only one is in doubt with respect to this question.[3] In the first place, John thinks it is certain that logic deals with beings of reason, which are attributed to the things known and to the linguistic expressions which logic uses as its instruments.[4] In the second place, John thinks it is certain that logic does not consider all beings of reason, but only those which are founded in things known. The only question John sees is whether logic has as its formal object the beings of reason, which are second intentions, or whether it is concerned with the real operations of the intellect. He resolves the question, "iuxta mentem S. Thomae,"[5] by saying that the formality under which things known and operations of reason pertain to logic is something of reason which is not a fiction, but which has a foundation in things, such as a second intention. In other words, considering the alternatives he has established, John agrees with Aquinas on the point, but even though he is quoting "adinvenit" from Aquinas' commentary on Hermeneutics iv, he has altered the meaning of Aquinas' position by placing it in the context of his own notion of beings of reason and his own certainties about the question at issue. John next clarifies his position by maintaining that from the ordination of logic something real accrues to concepts or objects known, but that this reality is not the formal object of logic, since it formally considers only the entities of reason themselves.[6] This clarification shows on the one hand that John considers the concepts, and the effects of logical ordination on them, to be realities;

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[1] Ibid., $260^{a}1$-33. [2] Ibid., $260^{a}34$-$^{b}26$. [3] Ibid., $260^{b}30$-$^{a}43$.

[4] Ibid.: "Primo est certum et extra controversiam Logicam agere saltem de aliquibus entibus rationis, quae inveniuntur et attribuuntur rebus cognitis . . . ." (Italics mine.)

[5] Ibid., $261^{b}1$-$265^{b}26$. [6] Ibid., $265^{a}11$-$265^{a}5$.

it shows on the other hand that he will not permit a simple reduction of entities of reason to reality, for he denies that logic concerns the very operations of reason in such a way that its object could become identified with the objects of the sciences it directs.[1]

Against this thesis, John again raises the objection that entities of reason cannot be the formal object of logic, since logic is a science, and such entities cannot be an adequate object for a science.[2] His reply again is that the entities which logic treats are not mere fictions, but they have a foundation in and order to real being; although there is not real knowability in them, they are objectively knowable, for although their being is effectively from the intellect, they are univocally knowable as objects.[3] Two other arguments against the thesis, based on the supposition that logic is formally concerned with real operations or real resultants, are proposed and answered.[4]

John next discusses two subordinate questions at considerable length. The first is: "Whether logic is a speculative or practical science."[5] His conclusion is that logic is essentially speculative, and from the point of view of itself it is absolutely speculative, although it assumes some mode of practicality insofar as it offers rules for the direction of speculation itself.[6] He explains the qualification that logic is speculative only reductively, by saying that this means it is speculative but less principally so.[7] John thinks that logic must be speculative fundamentally because it is invented only for the sake of avoiding ignorance—that is, achieving science, which is the purpose of speculation.[8] The second subordinate question which John discusses is: "How logical doctrine and applied logic are distinguished."[9] He treats the entire question of the heuristic use of logic here, but he also treats the role of logic in

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[1] Ibid., $264^{a}23$-35.
[2] Ibid., $265^{a}30$-$266^{b}12$.
[3] "Knowable" here is "scibile."
[4] Ibid., $266^{b}13$-$269^{a}7$.
[5] Ibid., $269^{a}15$-$277^{b}23$.
[6] Ibid., $271^{b}47$-$272^{b}32$. He quotes Aquinas in favor of his position.
[7] Ibid., $275^{a}35$-41.
[8] Ibid., $272^{b}33$-$273^{a}15$. He refers to the beginning of the Metaphysics.
[9] Ibid., $277^{b}25$-$284^{b}34$.

science as an application of logic, thus showing again that he considers it an adequately distinct science.[1]

Underlying John's positions on the nature and object of logic, there is, of course, an entire metaphysics and epistemology. For instance, John accepts the view of first and second intentions which distinguishes them according as the thing is considered in different states—in itself and in the intellect.[2] From all this, it seems to me that a likely hypothesis for investigating John of St. Thomas' logic is that he has a theory which is radically opposed to that of Aquinas. If this hypothesis were validated, many existing interpretations of Aquinas' logic, metaphysics, and theory of knowledge would be upset. Although Pseudo-Thomas is not quoted in these questions concerning the nature and object of logic, it seems to me that John's position is similar to Pseudo-Thomas'. However, John's care to make logic a true art at the same time he is making it a true science complicates his position. This other side of John's position also is revealed in his doctrine on knowledge, for he erects an elaborate theory of signs[3] at the beginning of his treatment of the proposition. In the conclusions of the following chapters, I shall indicate a few points of detail in John's logic; it seems to me, however, that a complete analysis, to which my work would serve only as a preface, is required.

With respect to the oppositions in modern logic, I shall not attempt to provide even the required preface. Modern logicians, unlike John of St. Thomas, generally do not devote treatises to the nature and object of logic; consequently, the investigation of their oppositions should be carried out by a study of the works themselves. Such an investigation presupposes

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[1] Ibid., 279[a]16-280[a]4 and 282[a]19-[b]34. He cites Aquinas' statements that logic provides the mode of proceeding, for his thesis; he cites In Meta., IV, lect. iv, where Aquinas specifically denies that logic of demonstration can be applied, as an objection. He resolves the objection by saying that Aquinas only is denying a heuristic use of logic in science, not an application of the doctrine.

[2] Ibid., 291[a]26-48. He refers to places where Aquinas distinguishes things from intentions, and to places where Aquinas distinguishes things primarily and understood from things secondarily understood—that is, from intentions—292[a]3-6; he also refers to the "De natura generis," but the authenticity of that work is uncertain (Cf. Eschmann, "Catalogue . . .." entry 93).

[3] Ibid., 646-722.

more technical competence than I have. However, an indication of some analogies which indicate that the investigation could be useful is not difficult.

Bertrand Russell, while identifying mathematics with logic,[1] also treats mathematics as a deductive science[2] concerned with the real world, but only with its more abstract and general features.[3] At the same time, he explains that logic deals formally with what can be said about any thing and any property, not with particular things and properties,[4] and that logic (or mathematics) is concerned exclusively with forms.[5] Although with some uncertainty, Russell holds that the constituents of logical propositions are pure forms.[6] He also explains a formal principle of inference as one which can be used as a premise in an inference and which also can serve to establish the fact that the premise implies the conclusion.[7] Now, such statements suggest to me that Russell viewed logic as a science—that is, as a speculative knowledge of its subject matter—and also as reflexive—that is, self-applicable.

Russell also professed to answer questions concerning the natures of number, infinity, space, time, motion, and mathematical inference itself with answers demonstrable with mathematical certainty; his answers consisted in reducing the problems to problems in pure logic.[8] Russell was dissatisfied that he could not push the reduction further; he says explicitly that the notion of the variable is one of the most difficult with which logic must deal, and a satisfactory theory of its nature is not offered in this work.[9] Mathematical constants are logical constants, and

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[1] Bertrand Russell, Introduction to Mathematical Philosophy, 2d ed. (London: George Allen & Unwin, Ltd., 1920), pp. 194-195.

[2] Ibid., p. 144. [3] Ibid., p. 169. [4] Ibid., p. 196.

[5] Ibid., pp. 199-200. [6] Ibid., p. 199.

[7] Ibid., p. 150. He says the distinction between the two uses is not very important, provided we realize that they are in theory distinct—p. 151.

[8] Bertrand Russell, Principles of Mathematics, 2d ed. (New York: W. W. Norton, Inc., 1938), pp. 3-4. The latter problems he did not profess to solve in that work.

[9] Ibid., pp. 5-6.

it is with these that the premises of mathematics are concerned.[1] Logical constants themselves cannot be defined; they only can be enumerated, and the practical method for discovering them is by analysis of symbolic logic.[2] It seems to me that these statements suggest that Russell viewed scientific logic as a reduction of sciences—that is, of mathematical science—to ultimate principles.

The analogy could be extended, I think. For example, Russell makes a distinction between being and existence, which seems similar to the distinction which Pseudo-Thomas makes between being of essence and being of actual existence.[3] Russell did not distinguish between real beings—first intentions—and intentional beings, so far as I can see. However, in his preface to the second edition of Principles of Mathematics, he explains how he has been forced to give up his earlier belief that some logical constants have being, and he concludes that they must be treated as part of the language, not of what the language talks about.[4] I think there is a similarity between Russell's "part of the language," which is not a part of what the language talks about, and Pseudo-Thomas' second intention, which can be an object of thought, but cannot be possessed by anything. I shall not try to press the analogy, however, since these points seem sufficient to suggest that Russell, in the works cited, maintained a view of logic which would be an instance of the first of my three types.

A striking case of the opposite position is found in some statements by Carnap in his Introduction to Symbolic Logic.[5] Symbolic logic is not a theory, for it does not make assertions about objects. Rather, a system of symbolic logic is a language; it is simply a group of signs with rules governing their use. However, this statement is not quite accurate, since what the logician constructs is a schemata of a language; its symbols must be given some definite significance before the system becomes a language. Giving the system an interpretation belongs not to pure but to applied logic.[6] Carnap's view seems analogous to that of Ockham—logic is

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[1] Ibid., p. 8. [2] Ibid., pp. 8-9.

[3] Ibid., p. 449. [4] Ibid., xi.

[5] Rudolf Carnap, Introduction to Symbolic Logic and Its Applications, trans. W. H. Meyer and John Wilkerson (New York; Dover Publications, 1958).

[6] Ibid., p. 1.

an art for constructing complex signs.

If we look at Kraft's description of the origin of neo-positivism,[1] the contrast with Russell's position concerning the nature of logic is evident. Kraft explains the fundamental importance of a distinction between the use and mention of expressions—which is analogous to Ockham's theory of supposition—and another distinction between properties of things and syntactic properties—which is analogous to Ockham's distinction between first and second intentions. He relates that by the use of these distinctions, Carnap was able to clarify many difficulties; Kraft gives as an example the distinction between implication and consequence, which he thinks Russell and Lewis has confused.[2]

He also explains how Carnap treated logic and mathematics as sets of rules; their symbols do not designate anything, but serve only as the symbolic formulation of the rules.[3] Russell pointed out in the preface to the second edition of Principles of Mathematics[4] that he could not accept this position. Even though Russell was prepared to abandon the reality of logical constants, he still felt sure that there must be some way to define logic other than by relation to a particular logical language; he also thought that Carnap was making the whole thing too much a matter of convention.

It seems to me that this analogy also could be extended. Moreover, it seems to me that the continuity of the development shows a ground of agreement between the two positions as to problems and certain principles.

When we turn to Dewey, we meet a quite different position. Dewey indicates two sets of views concerning the nature of logic. According to one of these, logic is a theory of ordered real relations. According to the other, it is concerned with the formal structure of language as a system of symbols.[5] Dewey's own position differs from both, for he holds that logical forms "arise within the operation of inquiry and are concerned with control of inquiry so that it may yield warranted assertions."[6]

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[1]Victor Kraft, The Vienna Circle (New York; Philosophical Library, 1953).

[2]Ibid., pp. 63-65. [3]Ibid., pp. 80-81. [4]P. xii.

[5]Dewey, op. cit., p. 2. [6]Ibid., pp. 3-4.

Dewey begins to clarify his position by discussing the objection that the field he wishes to assign to logic already is pre-empted by methodology; he claims that it is not necessarily true that there is a distinction between logic and the application of logic in inquiry.[1] Thus, Dewey denies both that logic is a reflexive science reducing knowledge to ultimate principles and that it is an art for the construction of symbolic systems. Logic is reflexive in that it is inquiry into inquiry; it is autonomous in that it is independent of metaphysical, epistemological, and psychological presuppositions;[2] and it is not adequately separable from primary inquiry in that its own subject always must have a real subject matter.

These remarks concerning the oppositions in modern logic are, I think, sufficient to indicate that the investigation I am making has some relevance. It seems to me that the modern positions might be examined in a pattern comparable to that which I am following. Moreover, I think such books as Kattsoff's Logic and the Nature of Reality and White's Reunion in Philosophy, considered from the point of view of these oppositions, show that such an investigation could be fruitful in relation to contemporary metaphysical problems.

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[1] Ibid., pp. 4-5.

[2] Ibid., pp. 20-22.