AN EXPOSITION OF A TREATISE WRITTEN BY SAINT ALBERT THE GREAT, ENTITLED DE NATURA LOGICAE

A DISSERTATION

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Fulfillment of the Requirements
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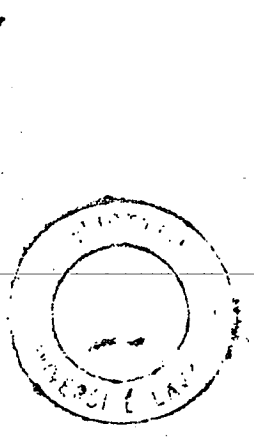
by
Richard J. Connell



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PROPOSITIONS

1. - Ars imitantur naturam.

2. - Artes quae actiones et passiones humanas imitantur dependent quantum ad veritatem ipsius artificii a synderesi et scientia morali.

3. - Potentiae animae ab actibus et objectis specificantur.

4. - In iis quae simpliciter fiunt propter aliquid, quando non fiunt causa eius quod accidit, sed fiunt causa alicuius extrinseci, tunc dicimus fiant a casu.

5. - Moralis philosophia in tres partes dividitur : monastica, oeconomica, et politica.

TABLE OF CONTENTS

INTRODUCTION

These first lines are not intended as an introduction or _prooemium_ in the strict sense[1] but are to be considered more as an apology for the present work.

Every student of history has heard the name of St. Albert, but few students of philosophy know any more about him. This is indeed something to be regretted; for not only did St. Albert train the mind of St. Thomas, but in addition he wrote his own philosophical treatises - works which deserve study and attention on the basis of their own proper merit. The writings of St. Albert are very extensive; they bear upon almost every human discipline. Moreover, there is one very singular fact to be brought to light regarding them, they contain the only competent, complete commentary we have on the whole of the _Organon_. St. Thomas, the reader will recall, has left us only two authentic logical works: a commentary on the _Perihermenias_ and a commentary on the _Analytica Posteriora_; the [illegible] upon even if

The primary end of our thesis is a modest one: to publicize as much as it is within our power the works of this great mind. We have attempted to achieve such an aim through an exposition of St. Albert's introduction to his commentary

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1. St. Thomas, _Commentarium in Aristotelis Librum de Anima_, Liber I, lectio I.

on the Organon. The very fact that a part of his work is being considered does something to make his name known. But the value of his writings is better manifested by a comparison of his doctrine to that of St. Thomas. The writings of the Angelic Doctor have the highest approbation the Church can give to a human work,[2] and if it can be shown that the teaching of St. Albert conforms to that of St. Thomas, we have introduced the saint with an argument from authority which will carry weight with every student of philosophy within the Church.

The actual accomplishment of this task, however, presents some difficulties. In the course of his treatise St. Albert has touched upon a large number of the fundamental notions of philosophy. In explaining the doctrine involved in each notion we have tried to present what is most formal. This supposes an acuity and refinement of judgment which we can only hope to approach. Sometimes it is easier to say a great deal than it is to say a little; for in saying much the formal aspects of the problem are touched upon even if it be "by accident", as it were. In such a case the writer's knowledge is not as formal as is to be desired. However, if he presumes to give the "heart of the matter" he must possess the truth in a very rigorous and formal manner. The difficulty of our task is apparent, then, especially when the reader realizes that a total of eight major notions are considered in the first two chapters alone.

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2. John of St. Thomas, Cursus Philosophicus: Tractatus de Approbatione et Auctoritate Doctrinae Angelicae Divi Thomae (ed. Solesmes, Paris 1931), T.I.

Having exposed our aims and methods we can conclude these remarks by noting that there is a secondary reason of some importance for undertaking this particular task. Because he does touch upon so many important matters, St. Albert's treatise would serve amazingly well as a text in philosophy for second or third year students on the undergraduate level. It would introduce them to nearly all the important notions and distinctions which are at the basis of Aristotelian and Thomastic philosophy. This, we feel, is an end which alone would justify our efforts.

EXPOSITION OF CHAPTER I

As an introduction to his commentary on the Organon, St. Albert treats the nature of logic. In this treatise the author does two things: I) he manifests the division of the text; II) he begins to treat his subject. The treatment of the subject is divided into two principal parts: A) the an est of the subject; B) the quid est of the subject. An sit logica involves three parts: 1) whether logic is a special science (chapter I); 2) whether logic is a part of philosophy (chapter II); 3) what is the necessity and utility of logic (chapter III). The question quid est logica St. Albert divides into two parts: 1) what is the subject of logic (chapter IV); 2) what is the division of the subject (chapter V). After manifesting the division of the subject he considers each of its parts in some detail (chapters VI, VII).

Having shown the division of the treatise St. Albert then begins to consider the first question, whether logic is a special science. And he does three things: a) he proposes an objection declaring logic to be the mode of science and, therefore, not a science in itself; b) he replies to the objection showing that logic has a special subject and is, consequently, a special science; c) he shown that logic is imperfect in nature and must be perfected by art.

A propos of this first chapter it is our intention to treat the following topics:

I. The Nature of Discourse

II. The Common and Proper modes of science

III. Art imitates nature: How the art of logic imitates nature.

I. THE NATURE OF DISCOURSE

St. Albert shows that there is a special subject of the science of logic by the following argument:

> .....est tamen unus communis modus scientiae per quoddam commune quod est in omni scientia. Et hoc est quod per investigationem rationis ex cognito devenitur ad cognitionem incogniti: hoc enim fit in omni scientia quocumque modo dicta, sive sit demonstrativa, sive non demonstrativa. Et gratia illius communis, est in omni scientia modus unus communis omnis scientiae. Et hic modus est per actum rationis, qui ratiocinatio sive argumentatio est, de cognitione cogniti procedens in scientiam ejus quod erat incognitum, secundum quod Isaac in libro de Diffinitionibus rationem diffiniens, dicit quod ratio est animae intellectualis virtus, faciens currere causam in causatum. Causam generaliter vocans et large, omne quod secundum intellectum simpliciter, vel quoad nos antecedit ut cognitum, per cujus cognitionem ductu rationis devenitur in notitiam incogniti. Hic autem modus quamvis communis sit per hoc quod ponitur in qualibet scientia, tamen secundum se consideratur et non immixtus scientiis, est quoddam per se distinctum ab omnibus aliis, et hoc modo consideratus hic modus, potest esse subjectum scientiae, et scientia specialis de ipso est:.....(1)

According to the author the common mode of science results from an intellectual operation by which the reason generates from something known a knowledge of something which was priorly unknown.

To generate knowledge of one thing from another is to discourse, and by virtue of the discursive or ratiocinative character of the human intellect a mode is imposed upon all of its scientific knowledge; but when this mode is considered in abstraction from the many sciences (immixtus), it itself, is the object of a special discipline.

To expose and elaborate this argument two points must be considered: A) the nature of discourse; B) how discourse imposes a common mode on all the disciplines. Furthermore,, under A) two points will be taken up: 1) the nature of discourse; 2) the cause of discourse.

A. THE NATURE OF DISCOURSE

1. The Nature of Discourse

The human mind has two names: intellect and reason. It is important to begin by distinguishing them:

> Intelligere enim est simpliciter veritatem intelligibilem apprehendere; ratiocinari autem est procedere de uno intellecto ad aliud, ad secundum veritatem intelligibilem cognoscendum. Et ideo Angeli, qui perfecte possident, secundum modum suae naturae, cognitionem intelligibilis veritatis non habent necesse procedere de uno ad aliud: sed simpliciter et absque discursu veritatem rerum apprehendunt... Homines autem ad intelligibilem veritatem cognoscendam perveniunt procedendo de uno ad aliud, ut ibidem dicitur; et ideo rationales dicuntur.(2)

Intelligere is used to denominate a simple, uncomposed, intellectual act by which an intelligible truth is apprehended. A being which knows in this way is said to know in an intellectual mode, and the faculty to which such an act belongs is an intellect.

Intelligere is an act which is proper to separated substances. Because of the perfection of their intelligences they exhaust the knowability of an object in one operation. But the human mind by means of many operations and concepts attains intelligible truth through a kind of motion. This movement and multiplicity are signified by ratiocinari. The mode of such a mind is said to be a rational mode, and the faculty to which it belongs is denominated a reason. Reason is opposed to intellect as the complex to the simple, the mobile to the necessary, the imperfect to the perfect. However, in man an imperfect intellection is presupposed to ratiocination; hence both reason and intellect can be said of the human mind.

We shall now begin to consider the nature of the ratiocinative act, and first we must note that the term discourse has a twofold signification:

> .....in scientia enim nostra duplex est discursus: unus secundum successionem tantum; sicut cum, postquam intelligimus aliquid in actu, convertimus nos ad intelligendum aliud; alius discursus est secundum causalitatem; sicut cum per principia pervenimus in cognitionem conclusionum. (3)

In its first acceptation discourse signifies simply the successive use of concepts, one after another. This kind of discourse is merely the negation of simultaneity in the consideration of many things,(4) and it is to be found in all created intellects. The Divine Intelligence alone is not discursive in this sense. All creatures - since they are endowed with more than one concept or intelligible species which they must use one at a time - are discursive according to the first signification of the term. However, the object

of our concern is something which is not common to many intellectual creatures but proper to man; therefore, we shall be occupied with the discourse of causality.

In discussing whether or not logic is a special science, St. Albert distinguishes between the common and proper modes of science. The common mode has its root in the nature of the intellect which is a discursive one. St. Albert points out that motion is characteristic of a ratiocinative intellect; a motion by which the reason proceeds from a knowledge of what is known to a knowledge of something unknown:

> .....per investigationem rationis ex cognito devenitur ad cognitionem in cogniti: hoc enim fit in omni scientia quocumque modo dicta, sive sit demonstrativa, sive non demonstrativa. Et gratia illius communis, est in omni scientia modus unus communis omnis scientiae. Et hic modus est per actum rationis, qui ratiocinatio sive argumentatio est, de cognitione cogniti procedens in scientiam ejus quod erat incognitum, secundum quod Isaac in libro de DIFFINITIONIBUS rationem diffiniens, dicit quod ratio est animae intellectualis virtus, faciens currere causam in causatum. (5)

According to St. Albert the reason not only moves from the known to the unknown, but it does so through an act of the reason; hence, it would appear that discourse involves something on the part of the object and the intellect. By virtue of an operation the intellect manages to "bridge the gap" between known and unknown, the former being the cause of the latter.

It is evident that there are several obscure points to be clarified, so let us begin by considering what St. Albert means when he says that discourse proceeds ex cognito ad cognitionem incogniti.

It is peculiar to ratiocination to be cognitio ex alio, and cognitio ex alio is opposed to cognitio in alio:

> .....Dicendum, quod discurrere, proprie est ex uno in cognitionem alterius devenire. Differt autem cognoscere aliquid in aliquo et aliquid ex aliquo.
>
> Quando enim aliquid in aliquo cognoscitur, uno motu fertur cognoscens in utrumque, sicut patet quando aliquid cognoscitur in aliquo ut in forma cognoscibili: et talis cognitio non est discursiva. Nec differt, quantum ad hoc, utrum aliquid videatur in propria specie, vel in specie aliena. Visus enim non dicitur conferre neque videndo lapidem per speciem a lapide acceptam, neque videndo lapidem per eius speciem in speculo resultantem.
>
> Sed tunc dicitur aliquid ex aliquo cognosci, quando non est idem motus in utrumque; sed primo movetur intellectus in unum, et ex hoc movetur in aliud; unde hic est quidam discursus, sicut patet in demonstrationibus. Primo enim intellectus fertur in principia tantum, secundario fertur per principia in conclusiones.(6)

Cognitio in alio and cognitio ex alio are alike to the extent that in each there is a multiplicity on the part of the object. They are to be distinguished, as St. Thomas points out, by the motion of the intellect in which they are attained. To attain a plurality of objects in one movement or act of the intellect is proper to cognitio in alio. The assent to and judgment of each is attained in one operation; whereas, it is the multiplicity of this very assent or judgment(7) which characterizes discourse. Each object is judged distinctly, but the judgment of one is

posterior to and depends upon the judgment of the other. In this instance the knowledge is truly ex alio, for the act of knowing by which the object is seen is dependent upon and caused by a prior act.

It should be noted that all cognitio in alio is understanding (intelligere) but not all understanding is cognitio in alio, for the object may or may not be many. Likewise, ratiocination is formally denominated from the plurality of the operations, for in some cases the objects upon which the acts bear are not altogether distinct but are in some manner one:

> .....cum rationis sit de uno in aliud discurrere, hoc maxime in scientia naturali observatur, ubi ex cognitione unius rei in cognitionem alterius devenitur, sicut ex cognitione effectus in cognitionem causae. Et non solum procedituur ab uno in aliud secundum rationem, quod non est aliud secundum rem, sicut si ab animali procedatur ad hominem. In scientiis enim mathematicis procedit-ur per ea tantum, quae sunt de essentiam rei, cum demonstrent solum per causam formalem; et ideo non demonstratur in eis aliquid de una re per aliam rem sed per propriam definitionem illius rei.(8)

In perfect ratiocination there is not only a plurality of operations but also a plurality of objects. Discourse in the strict sense is a motion from one thing to another thing by means of multiple intellectual operations. However, there is still discourse even if the objects be many only in a certain manner.

It may be objected that the inferring of a conclusion and the judgment of it are not the same acts; likewise, the composition of subject and predicate in a proposition is not the same thing as the assent of the intellect to that proposition. The composition of the enunciation is presupposed to the judgment; similarly, the inference of the conclusion must precede the assent of the mind to it. Therefore, it might seem that what is formal to discourse is the composition of a subject and a predicate in the condlusion by virtue of a preceeding composition in the premiss.(9)

Nevertheless, it must be said that speaking most formally discourse consists in a judgment which originates from and depends upon a prior one. The perfection of knowledge lies in knowing the truth, which is attained by judgment. This is evident from our own experience. The mind is not content with the simple representation of an enunciation; but its inquiry is terminated only when it knows what is represented to it to be conformed to its measure, which is to know the truth. This is the term of knowledge. Hence, the intellect is not, formally speaking, in possession of a premiss until it has made a judgment. It knows the enunciation as soon as the composition has been made, but the premiss does not have the power to infer until it has been judged. Likewise, there is no conclusion until what has been inferred has been judged. Therefore, it is proper to speak of discourse in terms of judgment.

Perhaps it may be objected that in man judgment belongs to the second operation of the intellect and is not, therefore, simple. But although it is a complex act to the extent that it involves the comparison of a proposition to its measure, from the viewpoint of the light by which it is made judgment is simple, and it is said to belong to the mind insofar as it is an intellectus:

> Sunt autem rationis tres actus; quorum primi duo sunt rationis secundum quod est intellectus quidam.(10)

It is only by virtue of a light or manifestation that the intellect is able to judge. When the light is one the act is an act of understanding; when it is many, the act is multiple and ratiocinative. Therefore, discourse can be considered from the point of view of this manifestation:

> Discursus secundum causalitatem addit supra successionem cognoscendi, quod una cognitio causetur ex alia, ita quod ex uno noto seu cognito moveamur ad aliud ignotum ex vi prioris cogniti et manifestati; et sic manifestatio unius debet esse causa manifestationis alterius, non solum quia unum objectum illuminat aliud (hoc enim etiam in simplici intuitu plura objecta attingente obtinere potest) sed quia ipse cognoscens prius illuminatur circa unum, et in illo nondum illuminatur circa aliud, quia si eodem lumine utrumque attingitur, totum hoc pertinet ad simplicem intuitum, quia pertinet ad eandem manifestationem et lumen, seu notitiam, licet sint diversa manifestata ordine quodam, sicut oculus eodem lumine plura videt et unum per aliud, quia ordine quodam attinguntur ex parte rerum visarum, et similiter Deus plura attingit unico lumine. Requiritur ergo ad discursum quod sit diversitas, et ordo etiam in ipso lumine ut teneat se ex parte cognoscentis, et unum lumen oriatur ex alio, sicut ex lumine principiorum oritur lumen scientiae, ita quod primum lumen non sufficit ostendere per se ea quae inferuntur, sed habet se ut lumen probativum, id est, quod manifestat alterum per deductionem et illationem unius luminis ex alio, quia primum non est sufficienter in se comprehensivum totius.(11)

This rather long citation points out what is most fundamental to discourse. Its ultimate root lies in the multiplicity of the intellectual light. The light which manifests the premise causes the intellect to assent to it, and from this first light is generated another. There could be no second judgment without a second lumen; one is the efficient cause of the other.(12) For example, the light of the premisses of a syllogism is not sufficient to manifest all that is virtually contained therein. But it causes the assent of the intellect to them, and by virtue of this first act a new light is generated causing the assent of the intellect to the conclusion. And let this point be stressed: the light of which we are speaking is a light on the part of the knowing faculty. A dependence on the part of objects such that one depends upon and is illuminated by another is not the kind of illumination in question here. A multiplicity of ordered and dependent objects can be attained in one intellectual act, and when this is the case the light on the part of the knower is simple even though the illumination on the part of the objects be multiple.

It is evident by now that when we speak of the discourse of causality, the kind of causality with which we are concerned is efficient causality. To speak of the generation of one manifestation from another is to speak of efficient causality.

2. The Cause of Discourse

Having discussed briefly the nature of discourse it now becomes germane to show wherein it has its root. It is a propos to begin by pointing out that where there is discourse there is also composition and division:

> Respondeo dicendum quod sicut in intellectu ratiocinante comparatur conclusio ad principium; ita in intellectu componente et dividente comparatur praedicatum ad subjectum. Si enim intellectus noster statim in ipso principio videret conclusionis veritatem, nunquam intelligeret discurrendo vel ratiocinando. Similiter si intellectus statim in apprehensione quidditatis subjecti haberet notitiam de omnibus quae possunt attribui subjecto, vel removeri ab eo; nunquam intelligeret componendo et dividendo, sed solum intelligendo quod quid est. Sic igitur patet quod ex eodem provenit quod intellectus noster intelligit discurrendo, et componendo, et dividendo, et hoc scilicet quod non statim in prima apprehensione alicujus primi apprehensi potest inspicere quidquid in eo virtute continetur; quod contingit ex debilitate luminis intellectualis in nobis.(13)

The second and third operations of the intellect have the same root. Because the intellect in its first apprehension cannot know all that is virtually contained in the known object, it must have recourse to composition, division, and ratiocination.(14) As St. Thomas states, the inability to see all that is contained in the object is due to the weakness of the intellectual light within it. Moreover, the

> .....lumen intellectuale potest dici ipse vigor intellectus ad intelligendum, vel etiam id quo aliquid fit nobis notum.(15)

The concept or verbum can be called a light because it is id quo aliquid fit nobis notum. Thus, a weak intellectual light involves a weak concept; and a weak concept is one which

does not represent all that is knowable in an object. Hence, the human mind must form additional concepts through composition and discourse in order to have a more complete knowledge of the object. Furthermore, the weakness of the concept follows upon the weakness of the act, or the lack of vigor ad intelligendum, which in turn is rooted in the nature of the intelligence itself. This is, then, where the cause of discourse must be sought:

> .....Cum enim intellectus humanus exeat de potentia in actum, similitudinem quandam habet cum rebus generabilibus, quae non statim perfectionem suam habent, sed eam successive acquirunt. Et similiter intellectus humanus non statim in prima apprehensione capit perfectam rei cognitionem; sed primo apprehendit aliquid de ipsa, puta quidditatem ipsius rei, quae est primum et proprium objectum intellectus; et deinde intelligit proprietates et accidentia, et habitudines circumstantes rei essentiam. Et secundum hoc necesse habet unum apprehensum alii componere, et dividere, et ex una compositione et divisione ad alium procedere; quod est ratiocinari.(16)

The human mind is pure potency in the intellectual order. It must be reduced to act through a kind of motion. But motion involves a medium between potency and act which is imperfect act, for all movement is the passage from the imperfect to the perfect. On account of its potentiality, therefore, the mind at first knows only incompletely or in part.

In respect to its potentiality the intellect differs from some of the other operative potencies:

> .....Sunt autem quaedam potentiae, quae secundum seipsas sunt determinatae ad suos actus, sicut potentiae naturales activae; et ido hujusmodi potentiae naturales secundum seipsas dicuntur virtutes. Potentiae autem rationales, quae sunt propriae hominis, non sunt determinatae ad unum, sed se habent indeterminate ad multa: determinantur autem ad actus per habitus,.....(17)

The intellect, unlike natural active potencies, is not determinatum ad unum. It is unable to operate unless it acquires an habitus by which it is empowered to act. Logic is a special habit, ordered to the other speculative sciences, which determines in a general way the mode in which the intellect must order its concepts. This order is not given by nature; it must be acquired.

The last distinction is important; for it is on account of the fact that the intellect is a potency which is not determinatum ad unum that it must have recourse to logic. The habitus is a form perfecting the intellect and enabling it to operate, but before this form can be acquired the intellect must first possess logic. If, per impossible, the mind were of such a nature that in passing from potency to act it was not indifferent to its act, there would be no need for the art of logic.

B. HOW DISCOURSE IMPOSES A COMMON MODE ON THE SCIENCES

It is a matter of common experience that error is frequent in human thinking and that truth is difficult to attain. The reason is to be sought in the indetermination,

the potentiality of the intellect. It is determined to its end, the truth, only in general and not in particular. In a given instance the mind can attain either truth or error. Nature indicates no via to the truth. Moreover, because truth is formally in the intellectual operation,(18) and because that operation is not adequated to its measure by nature, an art is necessary to make up the deficiency:

> .....In omnibus autem quae ad finem aliquem ordinantur, in quibus contingit sic et aliter procedere, opus est aliquo dirigente, per quod directe debitum perveniatur ad finem.(19)

St. Thomas says that in these things which are ordered to an end but whose procedure is indeterminate in the singular, there must be a direction imposed by virtue of which the end is able to be attained. The direction is the opus of an art:(20)

> .....Nihil enim aliud ars esse videtur, quam certa ordinatio rationis quomodo per determinata media ad debitum finem actus humani perveniant.(21)

An art, then directs to an end, and logic is the art which directs the acts of the intellect in relation to its end, the truth. Logic supplies the determination which nature does not give, and by virtue of this art the intellect is able to proceed easily, orderly, and with the assurance of avoiding error. And because the art is one which determines the act of the intellect itself, it will be a mode common to all the disciplines; no science can ignor it.

II. THE COMMON AND PROPER MODES OF SCIENCE

St. Albert makes only a passing reference (22) to the common and proper modes of science, but their distinction is a subject worthy of consideration; for it is commonly held among Thomists that they are not the same. The general aim of this part of the thesis will be to point out that logic alone does not suffice to give the mode of procedure in a particular science:

> .....Dicit ergo primo, quod quia diversi secundum diversos modos veritatem inquirunt; ideo oportet quod homo instruatur per quem modum in singulis scientiis sint recipienda ea quae dicuntur. Et quia non est facile quod homo simul duo capiat, sed dum ad duo attendit, neutrum capere potest; absurdum est, quod homo simul quaerat scientiam et modum qui convenit scientiae. Et propter hoc debet prius addiscere logicam quam alias scientias, quia logica tradit communem modum procedendi in omnibus aliis scientiis. Modus autem proprius singularum scientiarum, in scientiis singulis circa principium tradi debet.(23)

Logic is a science which is not sought for its own [illegible]

In this text St. Thomas not only distinguishes the (24) two modes, but he also makes reference to their order of acquisition. Logic, or the common mode, must be acquired before all the other sciences and before the proper modes of the individual disciplines. The proper mode or ordo demonstrandi is to be treated at the beginning of each particular science, and it presupposes the art of logic.

It is our present intention to consider briefly the function of logic and to follow the consideration of it with a somewhat more extensive discussion of the ordo demonstrandi; we hope to terminate with some comparisons of the two modes.

A. The Common Mode of Science.

Mode, as it is used here, means order. Hence, when we speak of a common or proper mode we are speaking of an order of procedure in science. Logic is a mode which is common to all science; the various modes of demonstration are something added to the common method and vary according to each science. Since the nature of logic is the common subject of this paper, it will neither be necessary nor to the point to enter into a detailed discussion of it here; it will suffice to say just enough about it so that its distinction from the ordo demonstrandi can be pointed out.

Logic is a science which is not sought for its own sake but on account of the other speculative sciences:(24) In other words,

> Ad secundum dicendum quod scientiae speculativae, ut patet principio Metaphysicae, sunt de illis, quorum cognitio quaeritur propter seipsa. Res autem de quibus est logica, non quaeruntur ad cognoscendum propter seipsas, sed ut adminiculum quoddam ad alias scientias. Et ideo logica non continetur sub speculativa philosophia quasi principalis pars, sed sicut quoddam reductum ad philosophiam speculativam prout ministrat speculationi sua instrumenta, scilicet syllogismos et definitiones et alia huiusmodi, quibus in scientiis speculativis indigemus. Unde secundum Boethium..... non tam est scientia, quam scientiae instrumentum.(25)

The definition, syllogism, and other objects which belong to the consideration of this discipline are, therefore, instruments; and they are sought because they are necessary for the acquisition of scientific knowledge. As St. Thomas points out, Boethius calls logic the instrument of science. There is a point here that must be made clear, however:

> .....logica dicitur modus et instrumentum sciendi quasi obiective, non formaliter. Agit enim tamquam de obiecto de modo sciendi et de instrumentis necessariis ad alias scientias, ut sunt syllogismi, propositiones etc.; et ex parte huius obiecti differt ab aliis scientiis, quia aliae agunt de rebus, ista de modo sciendi. Et quia prius debet cognosci modus sciendi quam res, ideo dixit Aristoteles esse absurdum utrumque simul quaerere. Et eodem modo S. Thomas dixit non contineri Logicam principaliter sub Philosophia, quia non agit de rebus sicut illa, sed de modo cognoscendi res, quod est aliquod obiectum minus principale. Unde respondetur ad consequentiam argumenti, quod imprimis Logica non est instrumentum aliarum scientiarum sed ipsius intellectus, qui utitur Logica ut instrumento ad alias scientias dirigendas. Et ita solum sequitur, quod Logica adaequatur intellectui, non vero scientiis.(28)

Properly speaking logic is the instrument of the intellect rather than science. It is the object of logic or the <u>modus sciendi</u> which is the instrument of science. In other words, the rules which measure the definition, syllogism, etc., are the instrument of the reason; the definition and syllogisms which are formed by the intellect are the instruments of the different sciences. Hence, as a habit logic is adequated to the intellect and is ordered to the acquisition of other speculative habits.

It has already been pointed out that the intellect is subject to error and that truth or falsity is formally in its act. Thus, the primary concern of logic is to insure the intellect against error and to render the acquisition of truth less difficult:

> .....Hoc enim est proprium intellectivae partis, ut in seipsam reflectatur: nam intellectus intelligit seipsum et similiter ratio de suo actu ratiocinari potest. Si igitur ex hoc, quod ratio de actu manus ratiocinatur, adinventa est ars aedificatoria vel fabrilis, per quas homo facilliter et ordinate huiusmodi actus exercere potest; eadem ratione ars quaedam necessaria est, quae sit directiva ipsius actus rationis, per quam scilicet homo in ipso actu rationis ordinate, facilliter et sine errore procedat.(27)

This point must be emphasized: logic is an instrument designed to overcome the indetermination and tendency to error inherent in the very operation of the intellect itself; there is no error in things, but only in the mind. For this reason logic can abstract almost entirely from the objects known, retaining only what is common to them as they are in the state of being known. Horse, for example, is not an object of logical consideration insofar as it is an animal or species of animal, but only to the extent that it is more or less universal than some other object, the subject of predication, etc.(28) The order and disposition of the operations and concepts of the human mind depend in large part upon the intellect itself. Only in a general way are they determined by extrinsic reality. For this reason logic can abstract from the matter of the other disciplines. It must consider

the object known only insofar as it will serve to direct intellectual operations. The division of being into the categories is one example of the very general treatment accorded to things by the art of logic.

B. The Proper Mode of Science.

As has been said the ordo demonstrandi is not treated in abstraction but is considered at the very beginning of a science. It is a special method and has a special consideration. The proper mode is an order which is adapted to the exigencies of the particular discipline; it is, therefor, dependent upon something intrinsic to the science itself:

> .....Modus manifestandi veritatem in qualibet scientia, debet esse conveniens ei quod subjicitur sicut materiam in illa scientia. Quod quidem manifestat ex hoc, quod certitudo non potest inveniri, nec est requirenda similiter in omnibus sermonibus, quibus de aliqua re ratiocinamur.(29)

The end of science is to manifest a conclusion to which the intellect can adhere with firmness, and the instrument by which this end is attained is a persuasion or argument of some kind. But not all species of argument give the same degree of certitude,(30) and for this reason the subject of the science must be considered in the light of its necessity - which is the cause of certitude - in order to establish which method is proportioned to it. In order to clarify this first point, let us quote another text:

> .....ad hominem disciplinatum, ideat bene instructum, pertinet, ut tantum certitudinis quaerat in unaquaque materia, quantum natura rei patitur. Non enim potest esse tanta certitudo in materia variabili et contingenti, sicut in materia necessaria, semper eodem modo se habente. Et ideo auditor bene disciplinatus, non debet majorem certitudinem requirere, nec minori esse contentus, quam sit conveniens rei de qua agitur. Propinquum enim peccatum esse videtur, si aliquis acceptet aliquem mathematicum persuasionibus rhetoricis utentem, et si expetat a rhetorico demonstrationes certas, quales debet proferre mathematicus. Utrumque enim contingit ex hoc, quod non consideratur modus materiae conveniens. Nam mathematica est circa materiam, in qua invenitur omnimodo certitudo. Rhetorica autem negotiatur circa materiam civilem, in qua multiplex variatio accidit.(31)

Certitude is the determinatio intellectus ad unum, and the educated man knows the kind of certitude to be expected in a given science and the method proportioned to that kind of certitude. The certitude and, therefore, the methods of sciences differ because the determination of the intellect is caused by the determination in the thing itself, and not all objects are equally necessary. The educated man expects neither too much nor too little but only what the matter will allow. Thus, it is certitude and necessity which govern the ordo demonstrandi. As additional support for this thesis let us cite another text:

> .....Modus autem demonstrationis est diversus; quia quaedam demonstrant magis necessarie, sicut mathematicae scientiae, quaedam "vero infirmius", ideat non de necessitate; sicut scientiae naturales, in quibus multae demonstrationes sumuntur ex his quae non semper insunt, sed frequenter.(32)

Moreover, the certitude of a science can only be determined by an examination of its principles and a definition of its subject:

> Et, quia in scientia naturali non convenit este certissimus rationis modus, ideo in scientia naturali ad cognoscendum modum convenientem illi scientiae, primo perscrutandum est quid sit natura: sic enim manifestum erit de quibus sit scientia naturalis. Et iterum considerandum causas et principia considerare, aut sit diversarum scientiarum. Sic enim poterit scire quis modus demonstrandi convenit naturali.....(33)

It is not any difference in the subject which distinguishes it and its mode from the subject and mode of another science, but only that which properly differentiates it as a knowable object. The knowable object as such is properly distinguished according as it is abstracted from matter and motion. Therefore, the certitude of a science will have its root in these two abstractions:

> .....Speculabili autem, quod est obiectum speculativae potentiae aliquid competit ex parte intellectivae potentiae et aliquid ex parte habitus scientiae, quo intellectus perficitur. Ex parte siquidem intellectus competit et quod sit immateriale, quia et ipse intellectus immaterialis est; ex parte vero scientiae competit ei quod sit necessarium quia scientia de necessariis est, ut probatur in I Posteriorum. Omne autem necessarium in quantum huiusmodi est immobile, quia omne quod movetur in quantum huiusmodi est possible esse et non esse vel simpliciter vel secundum quid, ut dicitur in IX Metaphysicorum. Sic ergo speculabili quod est obiectum scientiae speculativese, per se competit separatio a materia et motu, vel applicatio ad ea. Et ideo secundum ordinem remotionis a materia et motu scientiae speculativae distinguuntur.(34)

Science is immaterial because it is in the intellect, and it is about the necessary because it is a habitus perfecting the intellect. Only that which is permanent is an intellectual perfection; hence, science is defined as cognitio certa per causas. But certain knowledge is only of those things which are necessary; therefore, science must be of the necessary:

> .....Quia vero scientia est etiam certa cognitio rei; quod autem contingit aliter se habere, non potest aliquis per certitudinem cognoscere; ideo ulterius oportet quod id quod scitur non possit aliter se habere.(35)

However, there is a difficulty in what has just been exposed, for that which is most necessary and immobile is the most immaterial. It would seem, then, that it is redundant to speak of abstraction from matter and motion, for when one says the former the latter seems to be implied.

However, it must be pointed out that science is of the necessary because it is certain knowledge. In other words, the necessity on the part of the object is a requirement resulting from a condition of perfect knowledge. The perfecting of the intellect is the cause of the stipulation of necessity on the part of the object. But certitude implies more than necessity. It implies also that the object be manifest and not exceed the capacity of the intellect;(36) for it is not the object alone which determines the intellect, but the object as evident to the mind. This proportion of the intellect to the object is essential to certitude:

> .....Sed illa quae in sui natura sunt immaterialia, non sunt certa nobis propter defectum intellectus nostri, ut praedictum est. Hujusmodi autem sunt substantiae separatae. Sed mathematica sunt abstracta a materia, et tamen non sunt excedentia intellectum nostrum: et ideo in eis est requirenda certissima ratio.(37)

Hence, these two requirements must be met if the science is to be certain: the intellect must be proportioned to the object; the object must be necessary. But this twofold demand leaves us in a certain quandary, for the necessary is opposed to the material; yet that which is most proportioned to the human mind is ens mobile, the object of natural philosophy, which is simpliciter contingent and opposed to the necessary:

> .....quamvis naturalis post mathematicam addiscenda occurrat, ex eo quod universalia ipsius documenta indigent experimenta et tempore, tamen res naturales, cum sint sensibiles, sunt naturaliter magis notae quam res mathematicae a sensibili materia abstractae.(38)

This peculiar condition of certain knowledge results in a compromise which makes mathematics the most certain of all the sciences. It is at the same time abstracted from motion and not entirely abstracted from matter, which renders its object at once necessary and proportioned to the human mind.

Moreover, by virtue of its abstraction from motion, mathematics demonstrates through only one cause; the formal cause:

> .....cum causa sit ad quam sequitur esse alterius, esse eius quod habet causam, potest considerari dupliciter: Uno modo absolute, et sic causa essendi est forma per quam aliquid est in actu; alio modo secundum quod de potentia ente fit actu ens. Et quia omne quod est in potentia, reducitur ad actum per id quod est actu ens; ex hoc necesse est esse duas alias causas, scilicet materiam, et agentem quid reduxit materiam de potentia in actum. Actio autem agentis ad aliquid determinatum tendit, sicut ab aliquo determinatio principio procedit; nam omne agens agit quod est sibi conveniens; id autem ad quod tendit actio agentis, dicitur causa finalis. Sic igitur necesse est esse causas quatuor. Sed quia forma est causa essendi absolute, aliae vero tres sunt causae essendi secundum quod aliquid accipit esse; inde est quod in immobilibus non considerantur aliae tres causae, sed solum causa formalis.(39)

Conversely, because natural philosophy is about mobile being it must demonstrate through all four causes. Consequently, in this science there can be no perfect certitude; because from some causes the effect follows only ut in pluribus. Whenever a science is obliged to demonstrate through a contingent cause its certitude is modified. For this reason it is necessary when treating the order of demonstration to consider the number of causes which will serve as principles of demonstration in the science under consideration. Along this line it can be pointed out that to the extent metaphysics considers motion it will demonstrate through final and efficient causes. Although its subject is defined without matter, nevertheless, separated substances are causes of certain motions. For this reason metaphysics is entitled to demonstrate through three causes:(40)

> .....agere et pati non convenit entivus secundum quod sunt in consideratione, sed secundum quod sunt in esse. Mathematicus autem considerat res abstractas secundum considerationem tantum, et ideo illae res prout cadunt in consideratione mathematici, non possunt esse principium et finis motus, et ideo mathematicus non demonstrat per causas efficientem et finalem. Res autem, quas considerat divinus, sunt separatae existentes in rerum natura, tales quae possunt esse principium et finis motus. Unde nihil prohibet quin per causas efficientiam et finalem demonstret.(41)

Likewise, to the extent that separated substances or ens inquantum ens is considered from the point of view of receiving its esse from another, metaphysics will demonstrate through three causes.

Let us now make some comparisons of the common and proper modes in order to highlight some of the more important points. First, we ought to note that logic is primarily ordered to truth in science, whereas the end of the ordo demonstrandi is principally to insure the proper certitude of the science.(42) Truth depends upon the rectification of the acts of the intellect, for it is there that truth is found. Certitude, on the other hand, depends upon the evidence of the object itself. It is for this reason that logic can abstract from the various disciplines, whereas the ordo demonstrandi is governed by the very principles of the particular science. Moreover, the two are not unrelated, for the proper mode is over and above the common mode which is presupposed.

The common mode is known and discovered by considering the object of the intellect in a general way, according to its state in the mind. The proper mode, however, depends upon the particular genus of object being considered, and the certitude of knowledge will depend in part upon the necessity intrinsic to the object as it is in reality.

Also, logic is concerned with the causes of things in a very common way, insofar as they generate a conclusion. Nor is the cause of knowledge always a cause in rerum natura. It can be, for example, an effect or a sign. The ordo demonstrandi, on the other hand, is concerned with causes in rebus which belong to the science, because certitude is dependent upon them. In short, the common mode is a method which is valid independently of a particular science; the proper mode is founded upon the proper subject of its science.

III. ART IMITATES NATURA: HOW THE ART OF LOGIC IMITATES NATURE

To begin let us note how the text of St. Albert gives rise to the problem we are about to consider:

> .....modus hic (logica) omnibus hominibus (per hoc quod intellectuales sunt quodammodo per naturam) inditus est. Sed imperfectus est qui in natura est: perficitur autem per artem adhibitam. Id enim quod in natura est, seminarium et imperfectum est, et quasi in potentia existens. Ex hoc enim quod homo intellectualis est et intelligentiae stratus, in quo sternuntur formae intellectuales in actu luminis intelligentiae, et per intellectum compositivus est unius formae cum alia per compositionem vel divisionem, fit homo admirativus eorum quae comprehendit accipiendo per sensum et intellectum, vel

> per intellectum solum. Per hoc autem quod admirativus est, suspenditur ad inquisitionem, et per inquisitionem comparat unum alteri. Per comparationem autem unius cum altero, ab eo quod est notum deducitur ad ignoti notitiam. Et sic hic logicae modus a natura quidem incipit: perficitur autem arte, et usu et exercitio recipit perfectionem: sicut et Victorinus optime dicit, quod natura facit habilem, ars facilem, usus autem potentem: sic enim natura perfectae sunt omnes artes et omnes scientiae. Et hinc est quod ars naturam imitatur.....(43)

It is apparent from this citation that according to St. Albert art imitates nature - at least in this instance - because it perfects nature. Ordinarily, to say that one thing imitates another is to imply that there is a similitude between the two, a similitude in which the imitation is derived from the imitated. It seems that this is the usual sense of the proposition, ars imitatur naturam. Hence, in order to show in what way art perfects nature it will be necessary to subdivide the topic into three parts: A) a general consideration of how human art imitates nature; B) how the arts which cooperate with nature are said to imitate it; C) how the art of logic imitates nature.

A. A GENERAL CONSIDERATION OF HOW HUMAN ART IMITATES NATURE(44)

The human intellect is pure potency in the spiritual order; hence, its knowledge must originate from objects extrinsic to it. The idea of the artist, therefore, will depend upon nature for its origin:

> Eius autem quod ars imitatur naturam, ratio est, quia principium operationis artificialis cognitio est; omnis autem nostra cognitio est per sensus a rebus sensibilibus et naturalibus accepta; unde ad similitudinem rerum naturalium in artificialibus operamur.(45)

Nature is the principle of all human knowledge.(46) In order to know, man must be acted upon by things outside the mind; and consequently, all knowledge is ultimately reducible to the senses. Even the fictions to which nothing in reality corresponds do not spring entirely from the imagination. A golden mountain is an example of what is usually called a pure fiction, and the denomination is not without reason; for there is no real thing of which the term can be predicated. However, the composition of golden and mountain is what is fictitious; for both gold and mountain are found in rerum natura. In a similar manner nature is the origin of all artistic ideas. Nature is the model of all art; or to speak more formally, nature is the exemplar of every idea:

> .....in nobis qui desumimus cognitionem ab objectis, ideae seu exemplaria quae formamus non ita sunt puras formae, quin sint etiam formatae et derivatae ab alio; id est, ab objecto exteriori; unde ideae etiam objectum solet dici exemplar seu originale, non formaliter sed objective, tanquam id a quo sumit intellectus speciem; non tamen objectum ad extra dicitur idea, quia nomine ideae intelligimus aliquid formatum et conceptum intra intellectum...(47)

The artistic idea represents to the artist not only the work to be made but also the method of procedure. Consequently, the artist's method is also an imitation of nature; for art as well as nature must proceed from the simple to the complex.

The arts of representation are very evident examples of imitation, and it is in them that we see most easily how nature is the exemplar.(48) The mechanical arts, however, are rather obscure in this respect. Nevertheless, a close examination will manifest their dependence upon nature. A hammer, for example, is an instrument designed to move a nail against considerable resistance. Certainly nature has given us the first instance of such violence. One body which strikes another causing the displacement of the latter suffices as an exemplar. Also, the fact that each body is composed of strong and durable material is important; for a hammer must be constructed of something hard and lasting. As another example it can be said that the mode of operation of an electronics engineer imitates nature, for in his art he must pass from the simple to the complex.

An idea then is essentially dependent upon something extrinsic to the mind which serves as the measure. For this reason anything that measures the intellect can be called nature. In artist painting a cathedral imitates nature because his picture is measured by the object he is portraying. However, in this instance that which is nature is also something artificial if one refers to the principle of its generation.

Nature is not only the principle of art in the line of formal causality, but it also furnishes the matter for the artistic opus. All created art supposes a matter supplied

by nature. Thus, to state that art imitates nature is to say that nature is a principle in respect to art, and so far we have seen that it is a principle in two orders of causality; namely, formal and material causality.

Up to this point we have discussed the similitude between the modes of operation and the works of art and nature insofar as art has its origin in knowledge derived from things. But the similarity does not end with the works and methods, for wherever there is a similitude of effects there is also a similarity of principles. In order to manifest this part of the problem, let us again have recourse to St. Thomas.

In book VI, lesson 3, of the Ethics, St. Thomas defines art as a habitus factivus cum ratione. Art is an intellectual habitus which is the principle of those operations terminating in exterior matter, for only that which is composed of matter is properly a factibile.(49) This is the primary sense of the term. However, the notion can be extended analogically to include sciences such as logic and mathematics. The reason for its extension is the fact that there is a certain opus in these disciplines.(50) Moreover, it seems that art can be further enlarged to include the moral disciplines as well:

> Respondeo dicendum quod ars imitatur naturam, et supplet defectum naturae in illis in quibus natura deficit. Unde, sicut per naturalem generationem aliquis filium producit, ita per ius positivum, quod est ars boni et aequi.....(51)

Here St. Thomas defines positive law (which belongs to the moral order) as the ars boni et aequi. It seems that he has extended the term to include the moral order, which is usually opposed to the artistic. Consequently, we must ask what is the justification for such a use of the term.

In the Ethics St. Thomas has the following passage:

> .....proprium (rationis) est cognoscere ordinem... Ordo autem quadrupliciter ad rationem comparatur. Est enim quidam ordo quem ratio non facit,(52) sed solum considerat, sicut est ordo rerum naturalium. Alius autem est ordo, quem ratio considerando facit in proprio actu, puta cum ordinat conceptus suos adinvicem, et signa conceptuum, quia sunt voces significativae. Tertius autem est ordo quem ratio considerando facit in operationibus voluntatis. Quartus autem est ordo quem ratio considerando facit in exterioribus rebus, quarum ipsa est causa, sicut in arca et domo.(53)

He shows here that order, which is the object of the intellect, is subject to a fourfold division: first, there is an order found in natural things which the intellect can know but cannot make, and which is the object of the speculative sciences; secondly, we have the order that the intellect gives to its concepts and which is considered by logic; in the third place, there is an order in the acts of the will which is proposed by the intellect and belongs to the consideration of moral science; lastly, the order in artistic works which, again, is given by the intellect and which is the object of the mechanical arts. However, let it be noted that there can be a twofold division of these genera according to whether or not the intellect is the principle of the order. The last three genera all have that much in common.

In each case the intellect is the principle of the order which it knows. This is the reason which allows the term art to be extended to include all three. Mechanical art proposes an order to be posited in matter, and to the extent that other disciplines also consider an order of which the mind is the author, they can be called arts.(54) We may now define the term in this broad sense:

> .....Nihil enim aliud ars esse videtur, quam certa ordinatio rationis quomodo per determinata media ad debitum finem actus humani perveniant.(55)

According to this definition art is a certain determination of the reason which enables human acts to reach their proper end by determinate means. It is an intellectual habitus which determines man to some end. But before we continue along this line, let us answer an objection.

Actus humanus, which is posited in the definition of art given above, in its primary sense is equivalent to prudential act. Prudential acts are deliberated, and deliberation is opposed to the notion of art, which is a certa ordinatio. It might be asked, therefore, by what license actus humanus can be extended to include the operations of art and the operations of the intellect.

In order to reply it must be noted that St. Thomas says:

> Dico autem operationes humanas, quae procedunt a voluntate hominis secundum ordinem rationis. Nam si quae operationes in homine inveniuntur, quae non subjacent voluntati et rationi, non dicuntur proprie humanae, sed naturales, sicut patet de operationibus animae vegetativae.....(56)

Here it is declared that a human act is distinguished by the fact that it proceeds from the will according to an order proposed by the intellect, an order of which the intellect is principle. Also it was pointed out above that the element common to the three genera denominated by the term art, is the causality of the intellect in relation to the order. Hence, the term human act can be extended by virtue of this same common element that allowed the broader sense of art; for to the extent that other operations proceed from the reason they are similar to human acts, and they can be analogically denominated human acts.

Having replied to this objection, let us return to our principal consideration. Art, it has been said, is a principle of operation. It is a determination of the intellect by virtue of which human operations are directed determinately to an end. What we wish to show how is that art as a habitus and determination of the intellect is a similitude or imitation of nature, nature being taken in the strict sense of intrinsic principles of motion. The definition of art which was exposed in the preceding paragraphs is a propos to this consideration. But before we begin the discussion, let us express our aim in another way.

In his introduction to the Politics, St. Thomas shows that art imitates nature because the human intellect, which is the principle of art, is a similitude of the Divine Intellect, and wherever there is a similitude of principles there is

also a similitude of operations and effects. (It is to be understood that the human mind is only proportionally similar to the Divine Intellect.) Nature in this instance is the effect of the Divine Causality. However, our purpose now is to show that the intellectual habit is a similitude of that nature found in the opera of the Divine Intellect. Nature is understood here as the intrinsic principle of motion in natural things.

In his commentary on the Physics[57] after demonstrating that nature acts for an end, St. Thomas concludes that the only difference between art and nature is that the former is an extrinsic principle whereas the latter is intrinsic. Therefore, nature is to be defined as a ratio cuiusdam artis, scilicet divinae, indita rebus, qua ipsae res moventur ad finem determinatum.[58] The similarity of this definition of nature to the definition of art given above is striking.[59] In comparing the two the mind sees at once that the habitus of art is an imitation of nature which in turn is a certain ratio artis divinae. Just as nature is a determination by virtue of which a natural being is moved to its end, so is art a determination by which man attains his end. In fact, arts are necessary for man because he lacks the determination given to other things by nature.

B. How the Arts Which Cooperate with Nature are Said to Imitate It

So far, our consideration has borne on that which is common to all the arts. There is, however, a more particular way in which some of the arts imitate nature. We read in the Summa Contra Gentiles:

> .....artium quaedam sunt in quarum materia non est aliquod principium agens ad effectum artis producendum, sicut patet in aedificativa:..... Aliqua vero est ars in cuius materia est aliquod activum principium movens ad producendum effectum artis, sicut patet in medicativa: In his autem quae possunt fieri et arte et natura, ars imitatur naturam.(60)

The various arts can be divided according to a difference in their matter. Some bear upon matter which is wholly passive, depending solely upon the artist to be actualized. A pile of bricks is unable to form a wall by an activity originating from within it. Only the mason can bring about such an effect. But the matter of other arts has a complete, active potency capable of producing the same effect that is produced by the artist. The animal body is perhaps the most evident example of this kind of artistic matter. The physician seeks to bring about health. The very matter of the art, the sick body, has an active potency capable of attaining health. This latter kind of art is said to imitate nature in a rather special way:

> In his autem quae fiunt a natura et arte, eodem modo operatur ars, et per eadem media, quibus et natura.(61)

In this instance the ends of nature and art are the same. The term of medicatio and sanatio, for example, is identical; namely, health. Some of the means are also the same. Nature cures by heat produced through a fever; medicine heals with heat from an electrical appliance. The office of this kind of art is, then wholly instrumental:

> Quando igitur praeexistit aliquid in potentia activa completa, tunc agens extrinsecum non agit nisi adiuvando agens intrinsecum, et ministrando ei ea quibus possit in actum exire; sicut medicus in sanatione est minister naturae, quae principaliter operatur, confortando naturam, et apponendo medicamina, quibus velut instrumentis natura utitur ad sanationem.(62)

The active potency within the matter itself is the principle agent. Art is merely the minister of nature. The physician, for example, applies a medicine or therapeutic which strengthens and aids nature. He furnishes nature with certain "tools" or means which aid in bringing about the desired effect. But what is important here is that nature is, simply speaking, the agent. Art plays the role of instrumental cause. In relation to purely passive matter, however, art is per se the cause of the effect; that is, it is the power of the art which brings it about, but the same is not true of those arts which are instruments:

> .....ad aliquid effectum operatur aliquid dupliciter.
>
> Uno modo sicut per se agens; et dicitur per modum naturae completae.....
>
> Alio modo aliquid operatur ad effectum aliquem instrumentaliter: quod quidem non operatur ad effectum per formam sibi inhaerentem, sed solum in quantum est motum a per se agente.(63)

A cause which acts per se is opposed to instrumental cause as the complete to the incomplete. A per se agent is one which acts by virtue of a form belonging to it per modum naturae completae; that is, a form which is complete, whole, unlacking. The instrument, conversely, operates by virtue of a form which is incomplete and unable of itself to bring about the effect. Although there is a certain proportion of the instrument to the effect, for anything which is on account of an end is specified by it;(64) nevertheless, the instrument alone is insufficient for achieving the desired term.

Perhaps the following citation will manifest the point more clearly:

> .....instrumentum habet duas operationes: unam quae competit ei secundum formam propriam; aliam quae competit ei secundum quod est motum a per se agente, quae transcendit virtutem propriae formae.(65)

An instrument, then, has two operations: one which belongs to it inasmuch as it is something in itself, and another which is proper to it inasmuch as it is an instrument. However, these two operations are not opposed to each other. The agent has heed of the instrument precisely as it is of such kind. The agent does not, as it were, disregard the form of the instrument; but rather, the form of the instrument is ordered to the operation of the agent. Consequently, St. Thomas can say:

> Agens instrumentale non disponit ad perfectionem inducendum a principali agente nisi secundum quod agit ex virtute principalis agentis: sicut calor ignis non magis praeparat materiam ad formam carnis quam ad aliam formam, nisi inquantum agit in virtute animae.....(66)

An effect flows from the instrumental agent only to the extent that the instrument is subjected to the principle agent and operates by virtue of it. Thus, the arts which bear upon matter with an intrinsic active potency imitate nature in a manner different from those arts of the first category. In the latter the end id proposed by art and art is per se the cause of the effect. In the former nature gives the end, and nature is the principal agent. In such a case art is reduced to an instrumental role; it is not per se the cause of the form which is the effect. An instrumental art is less perfectly an art than those whose matter is passive and which are per se the cause of the artistic form.

In spite of its subordination to nature in such instances, art can rightly be said to imitate nature. The imitation lies in its mode of proceeding. The artist must first observe nature; secondly, he can minister to nature by providing means which he has observed nature use. But art differs from nature in that the means are supplied extrinsically. For example, nature uses heat to cure and so does the physician. Nature produces heat internally by causing a fever. Medical art, on the other hand, will use an appliance of some kind to produce heat extrinsically. In each, heat is a means of obtaining health, and to that extent the media of art and nature are the same. But the cause or manner of producing heat differs in each case, and it is on account of a similitude implying some difference that art is said to imitate nature.

Furthermore, the art actually supplies a means which, unaided, nature cannot itself provide, and the art can be said to perfect nature.

C. How the Art of Logic Imitates Nature.

Logic is the art which bears upon the operations of the mind.(67) It is not, however, to be identified with psychology which also considers the intellect and its acts. The latter science considers intellectual operations insofar as they are something necessary and natural; but logic considers them only to the extent that they can be ordered and disposed artificially. The direction of the reason by logic is wholly artificial and in no way disposes the intellect with respect to the natural elicitation of its acts:

> .....Logica non deget elicere actus quantum ad suam entitatem, sed ut artificiose disponantur. Et quia dispositio artificiosa non aliter invenitur in actibus, nisi in quantum attingunt obiecta ordinata et disposita, idem est dirigere Logicam intellectum, ut eliciat actus suos artificiose, quod obiecta ipsa ordinata proponere, circa quae actus scientiarum eliciantur. Atque adeo primo et per se logica attingit intentiones secundas obiectorum, ordinem autem actuum ad illas effective actibus suis communicat seu directive aliis.(68)

Moreover, the matter of logic is one which has an intrinsic active principle of the kind previously discussed:

> .....Effectus autem artis (logicae) non ita dependet ab arte, ut non possit aliquo modo, saltem imperfecte, fieri sine illa, sicut dicit Philosophus, quod "addiscens artem operatur actionem artis sine arte".(69)

Logic, then, is similar to medicine; for just as nature can attain health without therapeutics the reason can attain truth without the art of logic. This is true not only for the first and second operations but the third as well. The mind, by virtue of a certain determination can discourse unaided by logic. This natural discursive ability is called natural logic:

> .....Naturalis enim (logica) non est aliud quam ipsum lumen naturale utens discursu, quod lumen naturale non est pura potentia intellectus, sed etiam intellectus cum habitu principiorum, quae naturaliter sunt nota.....(70)

The intellect endowed with the habit of first principles is the intrinsic active potency which is contrasted to art; it is the agens per se in any act of knowing. The art of logic is its instrument.

Hence, logic is one of those arts which imitate nature by cooperating with it. Logic is ordered to intellectual operations, which are its end. It perfects nature(71) by supplying certain means which nature itself is unable to provide. The surgeon can perform a bone graft; nature cannot. The transfer of tissue is a perfection given by art, although the restoration of the member is due to nature; for only nature is the principle of life and growth. Similarly, the mind can reason unaided. But only logic can supply the perfect ordering of objects and concepts which is necessary for the perfection of science. The reason unaided by art can use the first figure of the syllogism, but logic manifests and supplies the second and third.

The relation of art to nature in the case of logic differs from the relation of other arts to nature. Medicine, for example, is a habitus which is wholly extrinsic to the active principle of health in a body. Art and nature in this case are in no way one. But this is not true in natural and artificial discourse. It was shown earlier that natural discourse is an activity of the intellect founded on the habit of first principles. The knowledge obtained in the act, and the direction of the act both come from this habit. In artificial discourse, however, the knowledge is caused by the principles, and the direction of the act comes from logic. But logic, itself, is a science founded on the habitus principiorum. Nature in this case is not only the agens per se in the science of the real but is also the effective principle of the science of logic. Art and Nature are in a certain way one.

Let us consider this same point from another aspect. In the introduction to the Politics St. Thomas says:

> .....(natura) quaedam principia praeparat, et exemplar operandi quodam modo artificibus praebet.

Nature is the principle of all art but not always in the same way. Nature supplies the matter and is the exemplar of all arts universally. Of other arts, such as medicine and logic, nature is also the end; for these arts are instruments, and the end of an instrument is the operation of the principal agent. But in the case of logic, in addition to

all the other ways in which it is the principle of art, nature is also the effective principle. The agent of the opus which is the object of nature is also the agent of the instrument for attaining that opus. Nature is the author of its own instrument. Hence, logic is the art of arts; for it directs the intellect which in turn directs all the other arts. Thus, it should now be clear that when St. Albert declares art to perfect nature he does not mean that it is the principle of the natural form of things. He simply means that in some instances art is able to provide nature with means she is unable to supply for herself, and in this way art is said to perfect nature.

FOOTNOTES, Chapter I

1. Albert Magnus, Opera Omnia: De Natura Logicae (ed. Borguet, Paris 1890), T.I, cap.1, p.2.

2. St. Thomas, Summa Theologica, Ia, q.79, a.8, c.

3. St. Thomas, Ia, q.14, a.7. c.

4. John of St. Thomas, Cursus Theologicus, (ed Vives), T.IV, D.22, a.4.

5. St. Albert, loc. cit.

6. St. Thomas, Questiones Disputatae de Veritate, (ed. Marietti), q.9, a.15, c.

7. Although judgment and assent are formally distinct, they shall be used synonymously here, this, we believe, is permissable, because in spite of their distinction one implies the other. Judgment is not without assent, nor is there assent without judgment. See Thoma de Vio Cajetani, In Secundam Secundae, q.45, a.1.

8. St. Thomas, In Boethium de Trinitate (ed. Weysse, Louvain 1948) q.6, a.1, c.

9. "....St secundum hoc necesse habet unum apprehensum alii componere, et dividere, et ex una compositione et divisione ad alium procedere; quod est ratiocinari". St. Thomas, Ia, q.85, a.5, c.

10. St. Thomas, In I Posteriorum Analyticorum, lect.1, n.4.

11. John of St. Thomas, loc. cit.

12. For a treatment of the efficient causality of the premisses of a syllogism, see John of St. Thomas, Cursus Philosophicus (ed. Reiser), T.I, para II, q.24, a.2, p.758.

13. St. Thomas, Ia, q.58, a.4, c.

14. Separated substances are not handicapped in this way; for just as the angelic intellect sees the truth of conclusions in the principles, likewise, it knows the properties of a subject simply in knowing the subject. For the separated substance the disposition of the subject is the principle of knowing the predicate.

15. St. Thomas, Quaestiones Disputatae de Veritate, q.7, a.1, c.

16. St. Thomas, Ia, q.85, a.5, c.

17. St. Thomas, IaIIae, q.55, a.1, c.

18. Speculative truth is defined as the adequation of the intellect to the thing. The intellect is adequated or conformed to reality when it neither affirms something of a thing which it does not have in reality, nor negates something which does belong to the thing. Hence, it is the composition or division which is true or false.

19. St. Thomas, De Regimine Principum, cap. I, lect.1.

20. The use of the term art in such a broad sense will be discussed in part III of the exposition of chapter I.

21. St. Thomas, In I Posteriorum Analyticorum, lect.1, n.1.

22. St. Albert, loc. cit.

23. St. Thomas, In II Metaphysicorum, lect.5, n.335.

24. Logic is restricted to the speculative sciences because it is an instrument of resolution, which proceeds from the whole to the part, seeking to know a thing in terms of its formal principles. Composition, however, (which is the mode of practical science) proceeds from the part to the physical whole; that is, the term of composition is an existing, physical thing. The mode of composition will therefore depend upon the thing itself, and cannot be prescribed by a universal doctrine. Practical sciences, however, will employ logic to the extent that they proceed resolutively; but this mode is not proper to them. [illegible]

25. St. Thomas, In Boethium de Trinitate (ed. Weyser, Louvain 1948), q.5, a.1, ad secundum.

26. John of St. Thomas, Cursus Philosophicus, T.I, pars II, q.1, a.2, p.258,a17.

27. St. Thomas, In I Posteriorum Analyticorum, lect.1, n.1.

28. We are not to be understood as implying that logic is a science of pure forms. On the contrary, logic cannot abstract from its foundations in reality. The intention of genus, for example, can be applied to animal only because there is something in reality which is common to the several species of animal.

29. St. Thomas, In I Ethicorum, lect.3, n.32

30. See St. Thomas, In I Posteriorum Analyticorum, lect.1. This point will be taken up in part IV of the exposition of chapter II.

31. St. Thomas, In I Ethicorum, lect.3, n.36

32. St. Thomas, In VI Metaphysicorum, lect.1, n.1149

33. St. Thomas, In II Metaphysicorum, lect.5, n.337

34. St. Thomas, In Boethium de Trinitate, q.5, a.1, c.

35. St. Thomas, In I Posteriorum Analyticorum, lect.4, n.5.

36. There is a twofold certitude: the certitude or necessity of the object in itself, or secundum se; and the certitude of the act of the intellect, which is certitude quoad nos. Certitude quoad nos is formal certitude, and it is this certitude which is the subject of the present discussion.

37. St. Thomas, In II Metaphysicorum, lect.5, n.336.

38. St. Thomas, In Boethium de Trinitate, q.5, a.1, ad decimum.

39. St. Thomas, In II Physicorum, lect.10, n.15

40. For a statement of the number of causes through which metaphysics demonstrates, see St. Thomas, In I Physicorum, lect.1, n.5.

41. St. Thomas, In Boethium de Trinitate, q.4, a.4, ad septimum.

42. In order that there be no confusion, it ought to be pointed out that truth and certitude are not entirely separable in the natural order. They are related as are judgment and assent.

43. St. Albert, loc. cit.

44. The title of this section indicates a certain qualification of the proposition, ars imitatur naturam; namely, it is restricted to the field of human art. The proposition itself, however, does not imply such a restriction. It is applicable to angelic art as well as human. In the introduction to the Politics, St. Thomas proves the proposition in all its universality: ".....ars imitatur naturam. Cujus ratio est, quia sicut se habent principia ad invicem, ita proportionabiliter se habent operationes et effectus. Principium autem eorum quae secundum artem fiunt est intellectus humanus, qui secundum similitudinem quamdam derivatur ab intellectu divino, qui est principium

rerum naturalium. Unde necesse est quod et operationes artis imitentur operationes naturae: et ea quae sunt secundum artem, imitentur ea quae sunt in natura". Because there is a similitude of causes, ergo there is a similitude of both operations and effects; but the angelic intellect is a similitude of the divine intellect; therefore, angelic art imitates nature. Angelic art must also suppose matter, just as human art does. However, we are not concerned with the problem in all of its latitude, but only to the extent that it will be helpful in knowing logic. That is the reason this part of the treatise is concerned only with the principle taken from the second book of the Physics, which is quoted in the course of the discussion.

45. St. Thomas, In II Physicorum, lect.4, n.6.

46. This manner of imitating nature is peculiar to human art. Natural things measure man's knowledge; while the Divine Idea itself is the measure of angelic knowledge.

47. John of St. Thomas, Cursus Theologicus (ed. Solesmes), T.II, D.21, a.1, par.3.

48. The arts of representation are evident examples because they manifest nature. The opus, itself, is an image, which is ex definitione a principle of knowing its exemplar. It points out, as it were, that which it imitates. ".....Et ex hoc contingit quod imago, quae est expressa rei representatio, secundum figuram potissime attendatur, magis quam secundum colorem vel aliquid aliud. Et quia ars est imitatrix naturae, et artificiatum est quaedam rei naturalis imago, formae artificialium sunt figurae vel aliquid propinquum". (St. Thomas, In VII Physicorum, lect. 5.) Image in this sense, however, is found only in the arts of representation. But it should be pointed out that there is also a broader sense of image according to which all artifacts are called images. In this latter sense all works of art are images of nature: "Ad quartum dicendum quod imago accipitur a Boetio secundum rationem similitudinis, qua artificiatum imitatur speciem artis, quae est in mente artificis. Sic autem quaelibet creatura est imago rationis exemplaris, quam habet in mente divina..". (St. Thomas, Ia, q.93, a.2, ad quartum.) An artifact can be called an image in relation to the idea in the mind of the artist which is its measure. The ideas of human art, moreover, are not only a measure, but also are measured by nature; therefore, all artifacts are images of nature. Hence, since the opera of mechanical arts are not images in the sense of expressa rei representatio, but only in the broader sense just given, it will be more difficult to see just how nature is the exemplar in these arts. The image is not one which designates, so to speak, its exemplar.

49. St. Thomas, In VI Metaphysicorum, lect.1, n.1182.

50. "Ad tertium dicendum quod etiam in ipsis speculabilibus est aliquid per modum cujusdam operis, puta constructio syllogismi aut orationis congruae, aut opus numerandi vel mensurandi. Et ideo quicumque ad hujusmodi opera rationis habitus speculativi ordinantur, dicuntur per quamdam similitudinem artes, scilicet liberales, ad differentiam illorum artium quae ordinantur ad opera per corpus exercito,.....". (St. Thomas, IaIIae, q.57, a.3, ad tertium.)

51. St. Thomas, Supplementum, q.67, a.1, c.

52. Facit is italicized by us four times in this citation.

53. St. Thomas, In I Ethicorum, lect.1, n.1.

54. It must be noted that we are speaking of extending the term art to the moral order, and not to prudence. Moral science can be called an art to the extent that it considers and supplies more or less determinate rules for moral action. Prudence, however, cannot be called an art because deliberation is of the very ratio of prudence, and deliberation is opposed to art: ".....artifiex (non) deliberat inquantum habet artem, sed inquantum deficit a certitudine artis; unde artes certissimae non deliberant, sicut sciptor non deliberat quomodo debeat formare litteras. Et illi etiam artifices qui deliberant, postquam invenerunt certum principium artis, in exequendo non deliberant. Ex quo patet quod non deliberare contingit alicui..., quia habet determinata media per quae agit, propter hoc non deliberat". (St. Thomas, In II Physicorum, lect.14, n.8) Only to the extent that a consideration of moral acts recedes from the hic et nunc and passes into generalities can it become determinate. Hence, prudence, whose business it is to consider the hic et nunc in moral matters, is the contrary of art. Positive law, on the other hand, takes into account only the ut in pluribus; therefore, it can draw up a set of determinate principles which can be called an art. Moral science is in a position similar to that of positive law. It, too, is concerned with the ut in pluribus, and on its own level it can be called an art.

55. St. Thomas, In I Posteriorum Analyticorum, lect.1, n.1.

56. St. Thomas, In I Ethicorum, lect.1, n.3.

57. St. Thomas, In II Physicorum, lect.14, n.8.

58. Ibid.

59. ".....Nihil enim aliud ars esse videtur, quam certa ordinatio rationis quomodo per determinata media ad debitum finem actus humani perveniant.....".

60. St. Thomas, Summa Contra Gentiles, lib.II, cap.75.

61. St. Thomas, Questiones Disputatae de Veritate, q.11, a.1, c.

62. ibid.

63. St. Thomas, Questiones Disputatae de Veritate, q.27, a.4, c.

64. "Omne autem instrumentum oportet definiri ex sua fine, qui est usus instrumenti:.....". St. Thomas, In I Perihermenias, lect.7, n.2.

65. See footnote 66.

66. St. Thomas, Contra Gentiles, lib.III, cap.147.

67. St. Thomas, Perihermenias: Proemium; In I Posteriorum Analyticorum, lect.1, n.1.

68. John of St. Thomas, Cursus Philosophicus, T.I, p.264b24

69. ibid., p.263b3

70. ibid., p.261b50

71. In respect to art perfecting nature, St. Thomas says in his introduction to the Politics that ".....ars vero inspicere quidem potest ea quae sunt naturae, et eis uti ad opus proprium perficiendum; perficere vero ea non potest.....". Apparently this passage contradicts what we have just said about art perfecting nature. However, it is evident from the context from which this citation is taken that St. Thomas is speaking about the opera of nature. An agent is said to perfect a thing when it is the cause of the form of that thing. But even the arts which cooperate in the production of a natural opus are not properly the cause of it, because they function merely as instruments, as has been discussed above. In this sense they do not perfect nature. But to the extent that art can facilitate the attaining of a natural work, or supply for some deficiency in nature, it can be said to perfect it. It is in this sense that art perfects.

EXPOSITION OF CHAPTER II

Having established that there is a special science of logic, St. Albert then proceeds to consider whether or not it is a part of philosophy; and he divides the chapter into two parts. In the first part he exposes the position which holds that logic is not a part of philosophy, and in the second he presents an opposed opinion. In the first part St. Albert gives two reasons in support of the negative position. In the second part he does five things: first, he manifests the signification of the term philosophy under which logic is included as a part; secondly, he gives a sign of this acceptation of the term; thirdly, he gives a reason to show why logic must be a part of philosophy; fourth, he manifests the division of logic; fifth, he gives a reason to show why the term philosophy can be extended to include the sciences of the real, the moral sciences, and of defining, and because logic does not fall into any of the logic.

Our exposition of this chapter will bear upon the following topics:

1) the specification of the speculative sciences
2) the distinction between speculative and practical knowledge
3) the division of philosophy
4) the division of logic within the third operation of the intellect
5) the principle of the division of philosophy.

The order of these topics is the same as that to be found in the text of St. Albert.

I. THE SPECIFICATION OF THE SPECULATIVE SCIENCES

In the course of chapter II St. Albert raises an objection against logic's being a part of philosophy:

> Hanc autem scientiam qui modus est omnis philosophiae, quidam nullam partem esse philosophiae contendunt, dicentes non nisi tres esse partes philosophiae, scilicet physicam, mathematicam sive disciplinabilem, et metaphysicam sive divinam. Cum enim diffinitio dicens quid et propter quid medium sit in scientia, et diffinitio non possit variari nisi tripliciter, scilicet quod aut concipiat materiam sensibilem, quae cum motu est et mutatione; aut concipiat materiam intelligibilem, cujus essentia non est cum motu et mutatione secundum rationem, quamvis secundum esse sit in materia quae est cum mutatione et motu, sicut est magnitudo et numerus; aut nec secundum essentiam, nec secundum esse concipiat materiam sensibilem: videtur quod philosophia non habeat nisi tres partes essentiales, sicut et Aristoteles dicere videtur. Propter quod nonulli logicam scientiam sive rationalem, nullam partem dicunt esse philosophiae.(1)

The basis of this objection is the acceptation of the term "philosophy" to cover only the sciences of the real. Those who uphold it point out that the disciplines which are concerned with the real are diversified according to their mode of defining, and because logic does not fall into any of the three divisions, it is not, therefore, a part of philosophy. Our purpose here will be, then, to manifest the division of the speculative sciences and show how the intelligibility of logic differs from all of the real sciences.

The potencies of the soul are specified by their objects; and when a potency is the subject of several habits,

there are diversities in its object giving rise to the various habits. However, it is not any difference in the object which is the cause of a new habit or which specifies a science but only that difference which belongs to the object precisely as it is the object of such a power or faculty:

> Sciendum tamen quod quando habitus vel potentiae penes obiecta distinguuntur, non distinguuntur penes quaslibet differentias obiectorum, sed penes illas quae sunt per se obiectorum in quantum sunt obiecta. Esse enim animal vel plantam accidit sensibili in quantum est sensibile, et ideo penes hoc non sumitur distinctio sensuum, sed magis penes differentiam coloris et soni. Et ideo oportet scientias speculativas dividi per differentias speculabilium, in quantum speculabilia sunt. Speculabili autem, quod est obiectum speculativae potentiae, aliquid competit ex parte intellectivae potentiae et aliquid ex parte intellectivae potentiae et aliquid ex parte habitus scientiae, quo intellectus perficitur. Ex parte siquidem intellectus competit ei quod sit immateriale, quia et ipse intellectus immaterialis est: ex parte vero scientiae competit ei quod est necessarium, quia scientia de necessariis est, ut probatur in I Posteriorum.(2)

The object of science is something scibile (speculabile), hence, differences in the several disciplines will be caused by differences in the scibilitas of the specifying objects. Scibilitas (scientific knowability), moreover, involves two things: immateriality, because the known is received in the knower; necessity, because science is certain knowledge, and only those things which are necessary are certain. The certitude of science has already fallen under our consideration, so we shall limit this discussion to the distinction of the sciences according to their various degrees of immateriality.

Let us introduce the topic with a very pertinet quotation from St. Thomas:

> .....cum omnis scientia sit in intellectu, per hoc autem aliquid fit intelligibile in actu, quod aliqualiter abstrahitur a materia; secundum quod aliqua diversimode se habent ad materiam, ad diversas scientias pertinent. Rursus, dum omnis scientia per demonstrationem habeatur, demonstrationis autem medium sit definitio; necesse est secundum diversum definitionis modum scientias diversificari.(3)

Much is contained in the few words of this citation, and the best procedure will be to break down the paragraph and consider it one phrase at a time.

.....cum omnis scientia sit in intellectu.....

A knowing power differs from an appetite by the mode in which it attains its object. Knowledge is in the knower, but the good is not in the appetite. The knowing faculty draws its object within it; whereas the appetite is drawn to the object, and its movement terminates in the appetible thing which is something extrinsic:

> .....sicut bonum nominat id in quod tendit appetitus, ita verum nominat id in quod tendit intellectus. Hoc autem distat inter appetitum et intellectu, sive quamcunque cognitionem, quia cognitio est secundum quod cognitum est in cognoscente, appetitus autem est secundum quod appetens inclinatur in ipsam rem appetitam; et sic terminus appetitus quod est bonum, est in re appetibili; sed terminus cognitionis, quod est verum, est in ipso intellectu.(4)

Thus, the object of the intellect is in the intellect.

> Perfectio autem et dignitas intellectus in hoc consistit quod species rei intellectae in ipso consistit intellectu; cum secundum hoc intelligat actu, in quo eius dignitas tota consideratur.(5)

The object which is intelligible in act is united to the intellect by means of a species or concept in the intellect. Let us now consider the next part of the citation:

> .....per hoc autem aliquid fit intellibibile in actu, quod aliqualiter abstrahitur a materia;...

The union of the known with the knower brings about knowledge.

The object of the intellect is the intelligible in act, and the intelligible in act is in the intellect itself. Moreover, human knowledge is essentially something received, and this gives rise to certain implications in respect to the mode of the known when it is in the knower; for whatever is received is received according to the mode of the receiver:

> Cognitio autem dicitur secundum quod res cognita fit in cognoscente per modum cognoscentis, scilicet secundum esse spirituale et immateriale.(6)

Because the known is received in the mode of the knower, immateriality and spirituality are necessary conditions of the intelligible in act, or the known object, for the intellect is an immaterial faculty. However, immateriality is also a condition of sense knowledge, we must take some time to distinguish intellectual knowledge from sense knowledge.

To know is to become something other as other; or, in other words, to know is to receive an intentional form. Any knowing substance becomes something other than itself when it knows, and the object which is known is in the knower precisely as it is something other from the knower. This is the very nature of the intentional. An animal can digest

a carrot and in a certain manner the animal and the carrot become one. The animal assumes the carrot into its substance. The carrot, moreover, loses its identity of carrot. But the object is united to the knower in the soul by a similitude of the object which represents is according to its own species and distinctness from the knower. The known is not assumed into the substance of the knower. To become something other in this manner is to become it intentionally. The intentional nature of knowledge demands a certain immateriality on the part of the knower, whether the knowledge be sense or intellectual; for if the knower received its object as matter receives a new form the knower would become something else. The "otherness" of subject and object would be lost.

However, sense and intellectual knowledge differ in their immateriality; for although the representation of color which is in the eye is not one which is entitatively material, nevertheless, the object is represented according to material conditions, and it is principally in this respect that sense knowledge differs from intellectual knowledge. A sense receives according to its mode, and although it receives intentionally it is still a corporeal faculty and must receive according to singular, material conditions. A sensitive knowing power rises above matter only to a limited extent. Therefore, when it is said that the sense attains the singular and the material the statement is to be understood in this way:

.....sensus est virtus in organo corporali; intellectus vero est virtus immaterialis, quae non est actus alicuius organi corporalis. Unumquodque autem recipitur in aliquo per modum sui. Cognitio autem omnis fit per hoc, quod cognitum est aliquo modo in cognoscente, scilicet secundum similitudinem. Nam cognoscens in actu, est ipsum cognitum in actu. Oportet igitur quod sensus corporaliter et materialiter recipiat similitudinem rei quae sentitur. Intellectus autem recipet similitudinem eius quod intelligitur, incorporaliter et immaterialiter. Individuatio autem naturae communis in rebus corporalibus et materialibus, est ex materia corporali, sub determinatis dimensionibus contenta: universale autem est per abstractionem ab huiusmodi materia, et materialibus conditionibus individuantibus. Manifestum est igitur, quod similitudo rei recepta in sensu repraesentat rem secundum quod est singularis; recepta autem in intellectus, repraesentat rem secundum rationem universalis naturae: et inde est, quod sensus cognoscit singularia, intellectus vero universalia, et horum sunt scientiae.(8)

Hence, because singularity is an effect of matter, to abstract from sense knowledge, which is of the singular, is equivalent to abstraction from matter.

Having noted this difference between sense and intellectual knowledge, we shall now take up our more immediate problem.

Because the known is in the knower according to the mode of the knower, we find ourselves obliged to infer that a certain process is involved in attaining intellectual knowledge, for on one hand we see that only the immaterial is intelligible in act, and on the other we find that the objects we know are material and first known by the senses. As they exist and are attained by the senses they are intelligible in potency only. There must be, therefore, some process by which the object is rendered immaterial, and this process is called abstraction.

Moreover, it must be stressed that this process is abstraction a materia. We have already pointed out that material singulars are not attainable by the mind and that singularity is an effect of matter. Consequently, abstraction from singular conditions involves an abstraction from matter. The question to be considered, therefore, before we consider the degrees of immateriality of the various sciences is the question of the knowability of matter itself. Why are these things which owe their individuality to matter intelligible in potency only?

The human mind is potential and is reduced to act by the objects which act upon it:

> Illa enim quae est in intellectu nostro, est accepta a re secundum quod res agit in intellectum nostrum, agendo per prius in sensu; materia autem, propter debilitatem sui esse, quia est ens in potentia tantum, non potest esse principium agendi; et ideo res quae agit in animam nostram, agit solum per formam. Unde similitudo rei quae imprimitur in sensum, et per quosdam gradus depurata, usque ad intellectum pertingit, est tantum similitudo formae.(9)

Because matter is potency it cannot act upon the intellect. But human knowledge depends upon the ability of the object to act upon it. Therefore, to the extent that an object involves or does not involve matter it will be more or less intelligible in se and capable of acting upon the mind. In other words, the intelligibility of an object is in proportion to its actuality, and a thing is more or less actual according as it is more or less separated from matter. The specification of the sciences, therefore, depends upon the

degree of intelligibility of the various knowable objects.

> .....secundum quod aliqua diversimode se habent ad materiam, ad diversas scientias pertinent.

According to this principle the division of the sciences is threefold:

> Sciendum est igitur quod quaedam sunt quorum esse dependet a materia, nec sine materia definiri possunt: quaedam vero sunt quae licet esse non possint nisi in materia sensibili, in eorum tamen definitione materia sensibilis non cadit. Et haec differunt ad invicem sicut curvum et simum. Nam simum est in materia sensibili, et necesse est quod in eius definitione cadit materia sensibilis, est enim simum nasus curvus; et talia sunt omnia naturalia, ut homo, lapis: curvum vero, licet esse non possit nisi in materia sensibili, tamen in eius definitione materia sensibilis non cadit; et talia sunt omnia mathematica, ut numeri, magnitudines et figurae. Quaedam vero sunt quae non dependent a materia nec secundum esse nec secundum rationem; vel quia nunquam sunt in materia, ut Deus et aliae substantiae separatae; vel quia non universaliter sunt in materia, ut substantia, potentia et actus, et ipsum ens.(10)

It is evident, then, that there are only three sciences: natural philosophy, which abstracts from individual matter but not from common sensible matter; mathematics, which abstracts from individual matter and common sensible matter but not from intelligible matter; metaphysics, which abstracts from all matter. A fourth science is impossible, because it is absurd to suggest that the mind know and define an object with matter which in itself is not material. The process by which an object is abstracted in this manner is called formal abstraction.

It is not our purpose here to go into detail on this subject, for it is much too difficult to be treated at length here, nor is it germane to this paper; however, it is necessary

for our end to point out one of its properties:

> .....in abstractione formali seorsum uterque conceptus completus habetur; ejus scilicet quod abstrahitur, et ejus quo abstrahitur, id est formalis et materialis, ita quod conceptus alter alterum non includit.(11)

In formal abstraction there is a complete concept of that which is abstracted and a complete concept of that from which abstraction is made. Line has a complete definition which does not include sensible matter, and sensible matter has a complete definition which does not include line. This property of formal abstraction distinguishes it from the negative abstraction of logic. Formal abstraction is a positive abstraction, which is, of course, opposed to negative abstraction:

> ...(Est) duplex abstractio, alia negativa, alia positiva. Negativa concipit unam naturam omissis conditionibus individuantibus et circa illas negative se habendo. Abstractio positiva est illa, quae separat naturam a conditionibus non pure omittendo et relinquendo individua seu differentias individuales, sed cognoscendo id, quod relinquit et id, quod assumit, et consequenter cognoscendo id quod relinquit et id quod assumit, et consequenter cognoscendo distinctionem inter unum et aliud.(12)

> ...abstractio negativa... consistit in pura negatione seu omissione inferiorum accipiendo naturam ut unum. ...abstractio (positiva)... non est aliud quam abstractio facta cum cognitione positiva termini a quo, qui relinquitur, et naturae, quae ab illa accipitur.(13)

In opposition to positive abstraction negative abstraction ignores the terminus a quo. It is indifferent to the terminus a quo and does not take in into its consideration. This is the kind of abstraction which is proper to logic. It is impossible that logic consider that from which it abstracts,

for it is concerned with the known in its state of being known; and, therefore, the matter of any science falls under its consideration. The only way logic can attain a common subject is negatively, for there is nothing positive in reality which is common to all the sciences; for they differ in genus. Without negative abstraction rational philosophy would not be one science but many. However, because it does not consider matter, logic is said to be reductively in the third degree of abstraction:

> .....Obiectum autem Logicae, quod est ens rationis, habet abstractionem similem abstractioni Metaphysicae, id est ab omni materia, non per depurationem actualitatis ab illa, sed per negationem omnis materiae.(14)

Thus, if the kind of formal abstraction, or the mode of defining, is the basis for the division of philosophy, logic will be excluded from it; and this is the point of view of those who deny logic a place in philosophy. Their objection arises from the fact that they consider the sole business of philosophy to be the consideration of the real. Real objects, moreover, give rise to a distinct positive abstraction with a specific intelligibility, and because the object of logic does not have these properties, logic must, in their view, be excluded from philosophy.

II. THE DISTINCTION OF SPECULATIVE AND PRACTICAL KNOWLEDGE

After exposing the position of those who deny to logic a place in philosophy, St. Albert undertakes to show in what manner logic can be considered one of the philosophical sciences:

> Hanc autem opinionem alii quidam impugnantes dicunt philosophiae generalis esse intentionem omnem, omnium quocumque modo entium comprehendere veritatem, quantum homini possibile est comprehendere eam secundum rationem et intellectum. Ea autem quae sunt, dicuntur esse aut ab opere nostro, sive a voluntate, sive etiam ab intellectu scientiam quaerente: aut a natura generaliter dicta, quae ab opere nostro causari non potest. Et cum ea quae a natura sunt, nostrae sint causae scientiae, et non nos sumus causa ipsorum, non potest de illis esse scientia practica. Relinquitur ergo, quod de talibus apud nos non est nisi scientia contemplativa, quae lumine intelligentiae perficitur. Eorum autem quorum nos sumus causa per voluntatem, non potest esse apud nos scientia speculativa, sed tantum practica. Eadem enim sunt in quolibet scibili principia et causae et elementa cognoscendi, quae sunt principia essendi: quia aliter sequeretur, quod scitur a nobis, non sciatur secundum id quod non est. Et sic falso modo sciretur esse quod scitur, quod absurdum est.(15) [illegible]

What we shall consider in this citation is the distinction between speculative and practical knowledge.

It will be noted that St. Albert ascribes to philosophy a concern for all things of which the intellect can know the truth. Immediately thereafter he divides the material objects of knowledge into those things which are caused by the intellect or will and which are said to be <u>opera nostra</u>, and those things which are not subject to our domination but are caused by