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## Extension and Comprehension in Logic An Essay In Doctrine

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# Extension and Comprehension in Logic

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## An Essay In Doctrine

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Although the words 'extension' and 'comprehension' have been used in logical textbooks for more than three hundred years without anyone offering a serious appraisal of their validity, the question arises whether this sort of vocabulary is well-grounded, and whether logicians can defend their position concerning this manner of speaking. Let us examine whether the words 'extension' and 'comprehension' may be employed legitimately within the domain of logic, or whether these two words convey adequately the meaning intended by logicians. But before we consider this vocabulary as part of logic, the original meanings imposed on these words outside of logic should command our first attention. A better understanding of their multiple signification will help to avoid much of the confusion which has been associated with the distinction between these two words.

### I. NON-LOGICAL MEANINGS OF 'EXTENSION'

The word 'extension' is derived from the Latin noun *extensio*, which is based upon the past participle of the verb *extendo, extendere, extendi, extensus*. This verb is composed of two Latin words *ex* out + *tendere* to stretch. The Latin *extensio* translated into words of Anglo-Saxon origin thus appears to mean a 'stretching out.' Certainly such a translation readily conveys more meaning to us than the words 'expanding,' 'dilating,' or 'amplifying.'

How *extensio* was used in Latin by classical authors and what different kinds of meaning it acquired in context will be made clear by an ordered series of examples of its usage by noted writers. For clarity, this section will be subdivided into four parts, followed by a summary.

A. The *Thesaurus Linguae Latinae* contains in outline form the various meanings of *extensio*. The primary imposition of meaning given is that of 'stretching out.' As it is clear that the basic notion is that of a certain type of physical activity, it will be of value to study examples of the verb itself.

Funis (se) involvendo circum suculam extenditur et ita sublevat onera (*Vitr.*, 10, 2, 2)<sup>1</sup>.

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1. "Commune," *Thesaurus Linguae Latinae*, ed. Academiae Germanicae Berolinensis Gottingensis Lipsiensis Monacensis Vindobonensis (Lipsiae: In Aedibus B. G. Tenubneri, 1906), vol.V, p.1969. Henceforth, all references to this text will be abbreviated as TLL.

(The rope . . . is stretched taut . . .)

Deus sanctos suos in modum arcus et sagittarum dicatur extendere (HIER., *Epist.*, 34, 4, 2).<sup>1</sup>

(God may be said to stretch out His saints after the metaphor of a bow and arrows.)

This passage gives two meanings: a "stretching out of bow and arrows" which is a literal meaning (primary imposition), and a "stretching out of His saints" which is a secondary metaphorical usage.

In a more specialized way, this meaning 'to stretch out' is found in musical art:

Quemadmodum in psalterio extendamus nervias (VARRO, *Men.*, 366).<sup>2</sup>  
(Just as we pluck [stretch out] the strings on a psalter.)

When the *TLL* paraphrases Seneca, it tells us that the object being stretched out must possess certain quantitative aspects as boundary, shape, or height.

Per extensionem mutatur ambitus rei vel animantis, figura, altitudo sim (Cf. *Nat.*, 1, 9, 2).<sup>3</sup>

(The circumference of a thing or a living being, the shape, the height, etc., is changed by its being stretched out.)

Tertullian uses the word in the same univocal sense when he says:

Cum radius ex sole porrigitur . . . , non separatur a substantia solis, sed extenditur (*Apol.*, 21, 12).<sup>4</sup>

(When a ray is given out from the sun . . . , it is not separated from the substance of the sun but it is a stretching out of the sun.)

Ovid conveys the notion of 'outstretched' by declaring:

Dum volt succurrere sorori . . . frater et extentas porrigit usque manus (*Fast.*, 3, 872).<sup>5</sup>

(When he wishes to bring help to his sister . . . the brother offers his outstretched hands.)

This idea of stretching out the hands is retained in the following examples. In the first instance, the action is symbolically linked to a curse, while in the second case, the action is linked to a blessing.

1. *Ibid.*, p.1970. Unidentified English translations are the author's.

2. *Ibid.*

3. *Ibid.*

4. *Ibid.*, p.1973.

5. *Ibid.*, p.1975.

Jesus non avertit manum suam, quam extendit in Gaet. donec anathematizaret omnes (*Itala Jos.*, 8, 26).<sup>1</sup>

(Jesus did not turn away his hand, which he extended over the Gaet., until he cursed everyone.)

Joseph extendens manum dextram posuit super caput Ephraim . . . benedixitque (*Gen.*, 48/14).<sup>2</sup>

(Joseph extending his right hand placed it over the head of Ephraim . . . and he blessed him.)

All of the preceding examples contain the first and obvious meaning, namely, an act of stretching out. From these examples it should be clear that the primary and proper meaning of extension implies two elements: (1) the stretching out of, (2) quantitative parts. Extension implies that the parts of quantity have a certain mobility; that they are larger or smaller; that more parts can be compressed into less space and later can be made to occupy a larger space. It also seems evident that this word refers to a particular aspect of a whole with regard to the position of its parts, for one material object considered as a whole occupies the place where its parts are to be found.

B. Let us focus our attention on certain passages where the meaning of the word is clear, but where the explanations just given cannot be applied. In each example the expression 'to stretch out' will be discovered to make sense, yet there is always a proportional transfer of meaning.

Caesar employs the verb form in a less proper sense. From the notion of "prolonging a trip," he transfers the word to the one who prolongs the trip. Thus he creates a new proportional meaning whereby the Latin verb *extendere* is transferred from the activity of stretching out some other object to the activity of whereby the doer of the action performs the action on himself. As a result, *se extendere* comes to mean "to make a journey."

Pompeius . . . cum se magnis itineribus extendere (*Civ.*, 3, 77, 3).<sup>3</sup>  
(Pompey . . . when he would set out on great journeys.)

C. Seneca appeals to our imagination when he speaks of stretching out the ears. In this case, there is no stretching out of the ears in distance, but rather a figure of speech to indicate that the ears are eager to catch the words of the orator. Here again one finds the word used in a less proper sense inasmuch as extension is no longer applied to local motion in space, but to the non-spatial movements of the appetite.

1. *Ibid.*

2. *Ibid.*

3. *Ibid.*, p.1976.



Aeque stillare oratorem . . . nolo quam currere nec extendat aures nec obruat (*Epist.*, 40, 3).<sup>1</sup>

(I do not want an orator to speak too slowly anymore than I want him to rush along; neither should he overexcite their curiosity [overstretch their ears].)

This less proper meaning of the word is used again by Seneca to denote a stretching out in the sense of relaxing oneself.

Quidam se domi contrahunt (opp.) dilatant (syn.) foris et extendunt (*Epist.*, 20, 3).<sup>2</sup>

(Certain people are puritanical at home and very outgoing and extrovert away from home.)

In classical grammar, the basic notion of quantity is retained when the grammarian speaks of lengthening the vowel.

*Syllaba longa fit natura, cum vocalis extenditur* (FORTUN., *Gramm.*, VI, 279, 27).<sup>3</sup>

(A syllable becomes long by nature when its vowel is lengthened.)

In this example, words are quantitative because the length of vowels can be measured, but they are quantitative in a less strict sense inasmuch as all of the parts do not exist simultaneously. Hence the act of stretching out or lengthening is to be taken in a less proper sense.

D. Besides referring to emotions and appetites which are common to animals and men, the word 'extension' is also applied to peculiarly human knowledge and feelings. The *Justinian Code*, for example, speaks of widening the law by enlarging our understanding of the words. This operation is strictly intellectual.

Latius . . . legis interpretationem [extendere] (2, 40, 5, 1).<sup>4</sup>

([To stretch out] more widely the interpretation of the law.)

Vergil speaks of propagating or making known (stretching out) courage or glory, a quality which lacks all material ingredients.

Dubitamus . . . virtutem [i.e., *virtutis gloriam*] extendere factis (*Aen.*, 6, 806).<sup>5</sup>

(We hesitate . . . to propagate our virtue [i.e., *the glory of virtue*] with deeds.)

Livy talks about stretching out hope.

1. *Ibid.*

2. *Ibid.*

3. *Ibid.*, p.1979.

4. *Ibid.*, p.1978.

5. *Ibid.*, p.1977.

*Scipiones in Africam quoque spem extenderunt* (24, 48, 1).<sup>1</sup>  
 (The members of the *Scipio* family also extended hope in Africa.)

### Summary

Now to summarize the major variations of the meaning of 'extension.'

1. *Proper meaning*: the activity of stretching out of a material object. The notion of quantity is linked to this particular meaning. The result, that is, the thing stretched out, is also related to it.

2. *Less proper meaning*: the agent of the action stretching himself out with reference to local motion. This feat is possible because the doer of the action is himself a material, quantitative being.

3. *Still less proper meaning*: human emotions and appetites are said to be stretchable even though they may not be material objects in the same way as in the preceding instances.

4. *Common meaning*: knowledge which is in no way material may also be considered as something stretchable.

It is not amiss to make a few remarks at this juncture concerning the proper and common meanings of words. A proper meaning is one which does not presuppose another definition. For example, if one says that "John is a man," "Peter is a man," the word 'man' is being used in its proper meaning, because the definition of man as 'rational animal' presupposes no other definition. But if one declares "this statue is a man," there is a proportional transfer of meaning. One recognizes here a new meaning having a similitude with a prior meaning. The word 'man' no longer retains a proper meaning; it has now acquired a common meaning because it presupposes another meaning by virtue of the fact that it is predicated of the word 'statue.'

In like manner, the proper meaning of extension (to stretch out) is present whether the word is used in its primary imposition, less proper, still less proper, or common meaning. However, each transition of meaning is somewhat more removed from the original notion. This so-called transition or transference of meaning can likewise be explained in terms of quantity which is always found in some form or other with each variation of meaning. Whenever one refers to extension in the proper sense or less proper sense, the parts or subject extended (stretched out) are always quantitative *per se*. On the other hand, whenever the still less proper meaning is implied, the parts or subject are quantified *per accidens*. The analogical use of extension can be developed further so that the parts are no longer quantitative, but are only spoken of or imagined to be quantitative. This evolvment

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1. *Ibid.*

of meaning has already been designated as the common imposition of the word.

## II. NON-LOGICAL MEANINGS OF 'COMPREHENSION'

Let us consider the meanings found in the use of the word 'comprehension,' from the Latin word *comprehensio*. The latter word is based upon the past participle of the verb *comprehendo*, *comprehendere*, *comprehendi*, *comprehensus*, which is composed of two Latin words *cum* with *+prehendere* to grasp. The best English translation for the Latin *comprehensio* is 'a grasping completely.' For brevity, the analysis of this section will be divided into three parts, followed by a summary.

A. The *TLL* also presents an outline of various meanings for *comprehensio*. The primary meaning given is that of 'grasping' or 'seizing.' Once again let us study examples of the verb itself. First of all, the word refers to the physical motion of grasping something with the hand. According to Cicero,

Quid manibus opus est, si nihil comprehendendum est (*Nat. Deor.*, 1, 92)?<sup>1</sup>  
(What need is there for hands if there is nothing to be seized?)

The same meaning of a physical grasping with hands is employed by Caesar.

Comprehendunt utrumque et orant (*B.G.*, 31).<sup>2</sup>  
(They join them together and pray.)

The idea of seizing a beast is intended by Cicero in the following passage:

Anguibus domi comprehensis (*Div.*, 1, 36).<sup>3</sup>  
(Having seized the serpents in the house.)

Terence conveys the same meaning when he states:

Aliquem pro moeche comprehendere et constringere (*Eun.*, 5, 5, 23).<sup>4</sup>  
(To seize and hold someone as an adulterer.)

Vergil uses the word where the context would allow the translation 'to lay hold of.'

1. *Ibid.*, vol.III, p.2146.

2. Charleton T. LEWIS and Charles SHORT, *A Latin Dictionary* (Oxford: At the Clarendon Press, 1958), p.394.

3. *TLL*, vol.III, p.2146.

4. Charleton T. LEWIS and Charles SHORT, *op. cit.*, p.394.

Ignis robora comprehendit (*Georg.*, 2, 305).<sup>1</sup>  
(Fire lays hold of the trunks.)

Other examples can be cited where the word always signifies 'to grasp,' and yet its nuances may be best translated by different verbs according to the context.

Cum comprehendit [surculus] (VARR., *R. R.*, 1, 40 fin).<sup>2</sup>  
(When the [graft] takes root.)

Arbor terram comprehendere dicitur (*Columel.*).<sup>3</sup>  
(The tree is said to adhere to the earth.)

From speaking of plants which take root and trees which adhere, one can advance by analogy to speaking of the female of animals as 'conceiving.'

Si mulier non comprehendit (*Cels.*, 5, 21 fin).<sup>4</sup>  
(If the woman does not conceive.)

B. The second level of meaning is introduced when 'to grasp' may be translated 'to embrace.' Now, however, the word no longer names a local motion, but a human emotional activity either on the part of the sensible appetite or on the part of the rational appetite.

Comprehendere multos amicitia (CIC., *Cael.*, 6, 13).<sup>5</sup>  
(To embrace many with affection.)

The Christian writer, L. Coelius Lactantius Firmianus, talks about embracing virtue with zeal (the words *studio complecti*, 'embraced with zeal,' are prefaced to this quotation).

Quid est aliud colere virtutem nisi eam comprehendere animo ac tenere (*Inst.*, 1, 20, 21)?<sup>6</sup>  
(What else is it to cultivate virtue except to embrace and hold it with desire?)

Cicero also speaks of encircling someone with affection.

Comprehendere adolescentem humanitate tua (*Fam.*, 13, 15 fin).<sup>7</sup>  
(To embrace the youth with your kindness.)

1. *Ibid.*

2. *Ibid.*

3. ROBERTUS STEPHANUS, *Thesaurus Linguae Latinae* (Basiliae: Typis et impensis E. & J. R. Thurnisiorum Frat., 1740), vol. I, p. 611.

4. Charleton T. LEWIS and Charles SHORT, *op. cit.*, p. 394.

5. *TLL*, Vol. III, p. 2152.

6. *Ibid.*

7. Guill. FREUND et N. THEIL, *Grand Dictionnaire de la Langue Latine* (Paris: Librairie de Firmin Didot Frères, Fils et Cie, 1866), Vol. I, p. 572.

C. The word is still more extended to another level of meaning, that of knowledge, whether sensible or intellectual. When *comprehendere* refers to sense knowledge, it is often translated by 'to perceive' and not 'to grasp.' In the first example, the action of perceiving is performed by such external senses as vision and touch. In the second example, perception is made by the internal sense of memory.

'Quod est' nec visu nec tactu nec ullo sensu comprehenditur: cogitabile est (SEN., *Epist.*, 58, 16).<sup>1</sup>

('What is' perceived by neither sight or touch or any other sense: it is thinkable.)

Res brevis est, ut facile memoria comprehendatur (RHET., *Her.*, 2, 19, 30).<sup>2</sup>  
(The thing is brief in order that it may be perceived by memory.)

The notion of perceiving or grasping with the memory is also evidenced in the following example:

... has quinque dierum disputationes memoria comprehendamus (CICERO, 5 *Tusc.*, 121).<sup>3</sup>

(... let us remember these arguments of five days.)

The word 'comprehension' can likewise be applied to intellectual knowledge. In this case the word names or designates an activity of the intellect which draws the object to itself. Through knowledge, the intellect grasps and possesses the forms of things. In contrast to such activity, the first and second levels of meaning attached to the word 'comprehension' imply a reaching out of the object. Thus in the physical activity of grasping, the hand reaches out toward the thing; and in human emotional activity, the appetite wishes to grasp or reach out to the total entity of a thing.

Here are examples where 'comprehension' comports an activity of the intellect:

Omnes scelerum comprehendere formas, omnia poenarum percurrere nomina (VERG., *Aen.*, 6, 626).<sup>4</sup>

(To collect all forms of crimes, to mention cursorily all names of punishments.)

Neque enim numero comprehendere refert *species ac nomina* (VERG., *Geor.*, 2, 104).<sup>5</sup>

(For to gather in number does not refer to *species and names.*)

This same intellectual activity can sometimes be considered from the viewpoint of the object. For example,

1. *TLL*, Vol. III, p.2151.

2. *Ibid.*, p.2150.

3. Robertus STEPHANUS, *op. cit.*, Vol. I, p.612.

4. *TLL*, Vol. III, p.2148.

5. *Ibid.*, p.2149.

Breviter paucis comprehendere multa (LUCR., 6, 1082).<sup>1</sup>  
 (To describe many things briefly in few words.)

Or the same activity can be regarded from the viewpoint of the knower.

Breviter comprehens a sententia (CIC., *Fin.*, 2, 7, 20).<sup>2</sup>  
 (Expressing briefly by a sentence.)

In the following example, although the use of the word *comprehendere* is in the realm of knowledge, yet it refers to the physical activity of containing because 'volumes' contain wars inasmuch as words are contained in books which in turn are signs of wars.

Bella comprehendere viginti voluminibus (SETONIUS, *Vit. Plinii*).<sup>3</sup>  
 (To write of wars in twenty volumes.)

Cicero speaks of grasping something by the mind from some sensible sign. This activity implies a kind of argumentation.

Placuit ut Diogenem Habitus emeret . . . quo facilius aut comprehenderetur res eius indicio aut falsa esse cognosceretur (*Cluent.*, 47).<sup>4</sup>  
 (It was pleasing . . . in order that the thing would be more easily grasped by its sign or would be known to be false.)

Even though, according to one dictionary,<sup>5</sup> the seizure by intelligence is looked upon as an image borrowed from plants, namely that an opinion takes root because it has been implanted in the mind, it would seem more probable to look for a similitude between the hand and the intellect.

Si quam opinionem jam mentibus vestris comprehendistis: si eam ratio convellet, . . . (CIC., *Cluent.*, 2, fin).<sup>6</sup>  
 (If you have seized with your minds any opinion, if reason plucks it . . .)

In these previous examples belonging to this third part, the Latin verb *comprehendere* is no longer used in its proper or less proper meaning. The word has now acquired a common meaning.

The very citations of Latin classical authors seem to demonstrate clearly that the Latin word *comprehendere* was used on the level of knowledge. It is surprising to observe, therefore, that the famous French etymologists, A. Ernout and A. Meillet, maintaining the word

1. Charleton T. LEWIS and Charles SHORT, *op. cit.*, p.394.

2. *Ibid.*

3. Robertus STEPHANUS, *op. cit.*, Vol. I, p.612.

4. *TLL*, Vol. III, p.2150.

5. Cf. Guill. FREUND et N. THEIL, *op. cit.*, Vol. I, p.572.

6. *Ibid.*

*comprehendere* as used in this manner did not pertain to the classical period. They state that the classical word applied to knowledge was *apprehendere* and not *comprehendere*.<sup>1</sup>

The primary usage of the word *comprehendere* purports a physical grasping of something quantitative by the most universally useful instrument of man, namely, the hand. This activity of grasping can be ascribed to an inanimate element such as fire, or to an animate object such as a plant. This first meaning of part A is always on a material level of physical grasping. It is called the proper meaning of *comprehendere* because all the other usages presuppose this signification of a physical grasping. In other words, all other meanings are measured or weighed according to this physical grasping.

A change occurs in part B. While the object grasped may remain material, one element of meaning is sifted from the word. The activity of reaching out physically with the hand now becomes a grasping of another type. In this next level of meaning, the thing that reaches out to grasp its object employs a different instrument, that is, either the emotions or the will. For example, the sensible appetite can be said to grasp (embrace) someone with affection. This new level of meaning is less proper than the first because it presupposes a similitude, namely, the likeness of things which are different. The likeness is founded on the activity of grasping, while the difference arises from the instrument employed to execute the activity of grasping.

Finally, in part C, there is a further transference or sifting of meaning. Now the intellect, unlike the sensible and rational appetites, brings the object within itself inasmuch as that which is known assumes an intentional existence. Here the knowing subject has no quantitative parts, but it does possess material dispositions whereby that which is known is mentioned as if it were quantitative. In the case of the appetite, the object grasped becomes the measure of the one who grasps. However, in this third state, the level of sensible or intellectual knowledge, the senses or the intellect which grasp also impose their limits on the thing grasped. This third signification of *comprehendere* may be called the common meaning of the word.

It may be well to consider a few examples in which the noun *comprehensio* is found before the multiple meanings of the word are presented in a summarized form. On the purely physical level, this noun can purport a corporeal activity.

Non effugies de manu eius, sed comprehensione capieris (*Jer.*, 34, 3).<sup>2</sup>  
(Thou shalt not escape out of his hand, but thou shalt be caught in his grasp . . .)

1. Cf. *Dictionnaire Étymologique de la Langue latine* (Quatrième édition; Paris: Librairie C. Klincksieck, 1959), p.531.

2. *TLL*, Vol. III, p.2155.



In the following example, *comprehensio* imports a non-corporeal activity or state of affairs:

Sexta comprehensio, qua continetur urbs Roma, amplectitur Caspiae gentes (PLIN., *Nat.*, 6, 217).<sup>1</sup>  
(The sixth comprehension, in which the city Rome is enclosed, comprises the Caspian nation.)

Or again, the noun-form may be used to designate the activity of grasping with the senses or with the intellect.

Latiore quadam comprehensione per omnes . . . species . . . ire (QUINT., *Inst.*, 2, 5, 14).<sup>2</sup>  
(To go . . . through all . . . species of things with some wider comprehension.)

Sin . . . comprehensionem eam dicimus, ut non solum sensu quis et sapientia comprehendat, sed et virtute et potentia cuncta teneat, qui cognovit; non possumus dicere, quod comprehendat filius patrem (HIER., *Epist.*, 124, 4, 13).<sup>3</sup>

(But if . . . we call that comprehension, so that anyone who knows may comprehend not only by knowledge and wisdom, but also he holds all things in his strength and power; we cannot say that the son comprehends the father.)

When he discusses the art of oratory, Cicero employs the noun form of *comprehensio* (Gr. *περίσσω*) to mean a certain sphere, extension, circle or rounding of a sentence. Commenting on the rhythm of an oration, he declares,

and in this discussion inquiry has been made, whether it is in the whole of that rounding of a sentence which the Greeks call *περίσσω*, and which we call 'ambitus,' or 'circuitus,' or 'comprehensio,' or 'continuatio,' or 'circumscriptio,' or in the beginning only, or in the end, or in both, that rhythm must be maintained?<sup>1</sup>

### Summary

All of these variations of meaning attached to the word 'comprehension' can be summed up in the following manner:

1. *Proper meaning*: the activity of grasping completely a material object. The notion of quantity is also bound to this primary meaning. And, of course, the object grasped is likewise related to it.

2. *Less proper meaning*: human emotions (non-material) may be said to grasp another person with affection or to grasp something with zeal.

1. *Ibid.*

2. *Ibid.*, p.2156.

3. *Ibid.*



3. *Common meaning* : the external or internal senses are said to grasp, that is, perceive their proper objects with reference to sensible knowledge; or immaterial knowledge is grasped by an immaterial faculty.

The same transference of meaning which evolved with *extensio* is observed to occur with *comprehensio*. In each distinct meaning of the latter word, the notion of quantity is always present. In its proper setting, *comprehensio* implies that the parts or subject grasped are quantitative *per se*. In its less proper meaning, the parts or subject are quantified *per accidens*. Finally, in its common imposition of meaning, the parts are no longer quantitative. They are only said to be quantitative according to virtual quantity.

By way of postscript to this section, it is interesting to note that the sequence of meanings in the English language for the Verb 'to comprehend' did not follow the basic order of the Latin significations. Some meanings made an early appearance due to a literal translation from the Latin by Anglo-Saxon expressions: 'to overtake,' 'to come up and seize,' etc.

If any man do begin to follow after either of them . . . he is not able to comprehend or attain them with a Horse (TOPSELL, *Four-f. Beasts*, 1673, 561).<sup>2</sup>

But the earliest attested sense of this word was not to 'seize,' 'grasp,' 'lay hold of,' or 'catch.' The primary meaning, based on an English need for such translation from the Latin, was 'to grasp with the mind,' 'conceive fully or adequately,' 'understand,' or 'take in.' The following quotations exemplify such meanings:

Able to compass and comprehend the greatest matters, and nevertheless to touch and apprehend the least (BACON, *Adv. Learn.*, I, To King, 1605). To comprehend is to know a thing as well as that thing can be known (DONNE, *Serm. I, Cor.* xiii, 12, 1628).

Those things which our hands can grasp, our understanding cannot comprehend (YOUNG, *Centaur*, i Wks, IV, 115, 1757).

Those . . . do not comprehend the real nature of the crisis. MACAULAY, *Hist. Eng.* I, 152, 1848).<sup>3</sup>

### III. EXTENSION AND COMPREHENSION WITH REFERENCE TO THE THEORY OF KNOWLEDGE

In the process of examining the various meanings attached to 'extension' and 'comprehension,' it was observed that the Latin

1. Marcus Tullius CICERO, "The Orator," *Orations*, trans. C. D. Yonge (London: Henry G. Bohn, 1852), Vol. IV, p.445.

2. *The Oxford English Dictionary* (Oxford: At the Clarendon Press, 1961), Vol. II, p.741.

3. *Ibid.*

words were first used to name a certain activity of material things, and were eventually transferred to that special type of activity of certain living beings which is called knowledge. In this section an effort will be made to show that the uses of these two words in such meanings are not only facts of language, but also that these meanings do have bearing in philosophy. It is beyond the domain of this study to pass in review all of the nuances of meaning that these words can convey in the philosophy of nature.<sup>1</sup> This section will treat exclusively that branch of philosophy which is concerned with living mobile beings.

The justification for the above mentioned way of speaking is found when an adequate theory of knowledge is propounded. Consider, for example, the theory of Aristotelian knowledge as explained by St. Thomas.

Knowing beings are distinguished from non-knowing beings in that the latter possess only their own form; but the knowing being has also the natural capacity to possess the form of another thing, for the species of the thing known is in the knower. Hence it is evident that the nature of a non-knowing being is more contracted and limited; however, the nature of knowing beings has a greater *amplitude* and *extension*.<sup>2</sup>

Because the nature of a non-knowing being is more restricted and limited while the nature of knowing beings has greater amplitude and extension, Aristotle has said that

the soul [of knowing beings] is in a way all existing things; for existing things are either sensible or thinkable, and knowledge is in a way what is knowable, and sensation is in a way what is sensible.<sup>3</sup>

When the matter is limited by form, the word 'limitation implies perfection.<sup>4</sup> But when the form is limited by matter, the word 'limitation' implies restriction, contraction and imperfection. Since matter is the root source of inertia, all operations of a material composite flow from the form. It must be remembered that all forms are immaterial since they are non-matter. When, however, composites begin to manifest a greater number of increasingly complex operations, their forms may be said to be immaterial, that is to say, they have emerged from the limiting constraint (*coarctatio*) of matter.

A thing is able to know then by virtue of its immateriality; and the level or degree of knowing depends on the level or degree of

1. ST. ALBERTUS MAGNUS, "Physicorum lib. VIII," *Opera Omnia*, ed. Augustus Borgnet (Paris: Apud Ludovicum Vivès, 1890), Vol. III, L. VII, Tr. 1, c.3, p.490: "Motus autem [violentus] qui est ad aliud dicitur extensio."

2. *Ia*, q.14, a.1.

3. ARISTOTLE, *On The Soul*, III, c.7, 431 b 21-23.

4. Cf. *Ia*, q.7, a.1. This article is an important preliminary to the understanding of *Ia*, q.14, a.1.

immateriality. Thus plants do not know on account of their materiality.<sup>1</sup> But animals are said to be cognitive because they can perform newer and higher operations when they receive the forms of things without all of their individuating conditions. And man is still more cognitive because the operation of his intellect is such an activity carried on a higher level.

In the passage cited (*Ia*, q.14, a.1), the Latin word *extensio* is of special interest. Although we have used in the translation the word 'extension,' *extensio* could have been adequately translated by the words 'a stretching out' or perhaps 'a stretch.' Words such as 'stretchability' and 'stretchableness,' though not found in English dictionaries, could also be substituted and would be clearly understood. If objection is made to 'a stretching out,' it may be found acceptable to say 'stretching quality.' Thus the text of St. Thomas could read: "the nature of knowing beings has a greater amplitude and stretching quality." In the Latin original the two words *extensio* and *amplitudo* name in a positive way what is meant by the standard Thomistic thesis that immateriality is the root-condition of knowledge. If one wishes to understand what is meant by an immaterial mode of reception proper to knowledge, the explanation must be given in terms of quantity, and yet, strictly speaking, neither knowledge nor its mode of reception is quantity. Even though knowledge is immaterial, it must be spoken of as if it were material. Just as material beings are stretchable, so knowing beings, in a proportionate way, are also said to be stretchable.

It has already been mentioned that the Latin word *comprehensio* is best translated by the English words 'a complete grasp.' This notion of grasping something completely or perfectly by a knowing power in relation to its object is also discussed by St. Thomas. The reader will note that the following passage will be very accurate and still clear if he substitutes mentally the words 'a complete grasp' each time the word 'comprehension' appears in the translation, and likewise if he substitutes the words 'to grasp completely' for the verb 'to comprehend.'

Properly speaking, one thing is said to be comprehended by another if it is included within it; for something is said to comprehend when it can apprehend anything in all its parts simultaneously, that is, to include it in every respect.

Now what is included by another thing does not exceed it, but is less inclusive, or at least equal. However, these things pertain to quantity. Consequently, there are *two modes* of comprehension according to *dimensive* and *virtual* quantity. According to *dimensive* quantity, as a cask compre-

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1. Cf. ARISTOTLE, *On The Soul*, II, c.12, 424 a 32.

2. Cf. *Ibid.*, III, c.4, 429 a 18-28.

hends wine; but according to virtual quantity, as matter is said to comprehend form when no part of the matter is left unperfected by the form.

And in this way any knowing power is said to comprehend its known object, namely, inasmuch as what is known stands perfectly under its activity of knowing. However, when the thing known exceeds the activity of knowledge, then the knowing power fails in comprehension.

But this excess must be considered *differently* in different powers. For in *sensitive* powers, the object is compared to a power not only according to virtual quantity, but also according to dimensive quantity; in this that the sensibles move the sense inasmuch as it exists in space, not only by force of the quality of the proper sensibles, but according to dimensive quantity, as it is manifest from the common sensibles.

Whence comprehension of the sense can be impeded *in a twofold manner*: *in one way*, from an excess of the sensible object according to virtual quantity: for example, the eye is impeded from comprehension of the sun, because the force of the sun's clarity, which is visible, exceeds the proportion of the visual power which is in the eye. *In another way*, on account of the excess of dimensive quantity: for example, the eye is impeded from comprehending the total area of the earth, but it sees one part and not another, which did not happen in the first impediment; for all parts of the sun are seen by us simultaneously, but not perfectly since the sun is too brilliant.

Now the intelligible object is also compared *to the intellect* indirectly according to dimensive quantity, inasmuch as the intellect receives from the sense. Consequently, our intellect is also impeded from the comprehension of anything unlimited according to dimensive quantity, and this is so because some of it is in the intellect and some of it is outside of the intellect. However, the intelligible object is not related directly to the intellect according to dimensive quantity, since the intellect is a power not using a corporeal organ; but it is related directly to the latter only according to virtual quantity. And, therefore, the comprehension of the intellect is impeded in those things which are understood directly without conjunction to the sense only if there is an excess of virtual quantity: for example, when what is understood has a more perfect mode of being understood than the mode by which the intellect understands. If, e.g., anyone knows the conclusion that a triangle has three angles equal to two right angles because of a probable reason, based upon authority, or because it is commonly said, such a person does not comprehend it, not because he is ignorant of one part of it, another part being known, but because that conclusion is knowable by a demonstration, to which the knower has not yet attained; and, therefore, he does not comprehend it, because it does not stand perfectly under his knowledge.<sup>1</sup>

This passage indicates that *comprehensio* has several ways of being used with reference to sensible and intellectual knowledge. Just as 'extension' names the capacity of a knowing being to stretch out toward a certain number of knowable things, so 'comprehension'

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1. *De Ver.*, q.8, a.2.

signifies the complete grasp of knowable things.<sup>1</sup> In this section (*De Ver.*, q.8, a.2) it seems that St. Thomas is acting as a psychologist analyzing our activity of knowing. He is explaining the relation between concepts and things, but not the relations between the concepts themselves. It is easy to observe that St. Thomas uses the word *comprehensio* in respect to intellectual knowledge alone with great care. Since intellectual knowledge implies concepts, it would seem consistent with the teaching of St. Thomas to speak of the 'comprehension and extension of concepts.' But, on the other hand, what do many logicians mean when they speak of the comprehension and extension of concepts?<sup>2</sup> Are concepts the proper domain of logic, or are they proper to psychology?

In answer to these questions it would appear that those who speak of the comprehension and extension of concepts needlessly confuse students on the difference between logic and psychology. Logic is not directly interested in the concept but in the multiple and intricate relationships which arise between several concepts when man tries to obtain scientific knowledge about things. This needs further explanation.

In psychology, the concept is sometimes called the intelligible species or the mental word.

The intellect understands something in a *twofold way*: *in one manner formally*, and thus it understands by means of the intelligible species by which it is put into act; *in another manner* as an instrument which it uses in order to understand anything, and in this way the intellect understands by means of a concept, because it forms the concept for this purpose that it understands the thing.<sup>3</sup>

A concept, an intelligible species, or a mental word, is said to be an instrument by which the intellect knows a thing. As such it is a quality of the intellect, a personal possession. One does not say that the concept is the thing known because a concept and its object are not physically identical. This distinction between a concept and its object is implied when one refers to the 'object' of knowledge which

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1. In view of such meanings, one is justified in foreseeing the use of 'extension' to mean 'a stretching out to more and more things' and the use of 'comprehension' to signify 'a constantly improving grasp of the things known.' But more of this later.

2. Cf. among others: Antoine ARNAULD et M. NICOLE, *Logique de Port-Royal* (Nouvelle édition; Paris: Librairie De I. Hachette et Cie, 1869), p.55; Joshua OLDFIELD, *An Essay towards the Improvement Of Reason ; in the Pursuit of Learning and Conduct of Life* (London: Bible and Three Crowns, 1707), pp.70-71; Dominicus ANGELONI, *Institutiones Logicae* (Neapoli: Ex Typographia Raymundiana, 1772), L. 1, p.18; Ernst REINHOLD, *Die Logik oder die allgemeine Denkformenlehre dargestellt* (Jena: Erdterfichen Buchhandlung, 1827), p.115; Gottlob E. SCHULZE, *Grundsätze der allgemeinen Logik* (Göttingen: Vandenhoeck und Ruprecht, 1822), pp.50-51; Dr. Friedrich UEBERWEG, *System of Logic*, trans. Thomas M. Lindsay (London: Longmans, Green, and Co., 1871), p.126.

3. *Quodl.* V, q.5, a.2, ad 1.



signifies something that is different from knowledge. Whereas the concept itself as an instrument or means of knowing is a real being, the object of knowledge may be either a being or a non-being. For example, although Cinderella may not exist, a concept of her is nonetheless real.

Inasmuch as they exist in the mind for the purpose of bringing the knower in contact with things, concepts are called intentions. If these concepts are directed towards objects, real or not, they are called 'first intentions.' But when these concepts of things are considered in relation to each other, relations between the concepts arise because of the things known. These relationships are called 'second intentions.'

Those things which are first understood are the things outside the soul toward whose understanding the intellect is first borne. But the intentions following upon our mode of knowing are said to be the second things understood: for by this second activity the intellect understands inasmuch as it is bent back on itself, understanding (1) that it understands and (2) the mode by which it understands.<sup>1</sup>

Logic is not immediately concerned with the existence of a thing. "For the logician considers the mode of predication and not the existence of a thing."<sup>2</sup> It is only directly concerned with relationships between concepts which are beings of reason. "And a being of this kind, namely, a being of reason, is properly the subject of logic."<sup>3</sup>

Further, it is worthwhile noting that unlike psychology which considers concepts independently of any relationship with words, logic is interested in concepts inasmuch as they are bound to words.

Therefore, these are the three speculative sciences, and there are no more, as we remember that we said in our *III Book On The Soul*, because the logical sciences do not consider a being or any part of a being, but rather the second intentions about things implied by language, through which are had ways of moving from the known to the unknown according to an inductive or deductive syllogism.<sup>4</sup>

That part of philosophy, which is often called psychology, studies concepts as one of the many properties of the soul. Logic, on the

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1. *De Pot.*, q.7, a.9.

2. *In VII Metaph.*, lect.17, n.1658.

3. *In IV Metaph.*, lect.4, n.574. Cf. *In I Post. Anal.*, lect.20, n.171.

4. ST. ALBERTUS MAGNUS, "Metaphysica," *Opera Omnia*, ed. Bernhardus Geyer (Germany: Monasterium Westfalorum In Aedibus Aschendorff, 1960), Lib. I, Tract. I, p.3: "Istae igitur tres sunt scientiae speculativae, et non sunt plures, sicut et in *III Libro nostro De Anima* nos dixisse meminimus, quia scientiae logicae non considerant ens vel pertem entis aliquam, sed potius intentiones secundas circa res per sermonem positas, per quas viae habentur veniendi de noto ad ignotum secundum syllogismum inferentem vel probantem." Cf. ST. ALBERTUS MAGNUS, *Commentaria In Perihermenias Aristotelis* (Parisii: Ludovicus Vivès, 1890), L. I, Tr. 1, c.1, p.1.

other hand, studies the relations (second intentions) between concepts. Hence it is possible for psychology to be interested in only one concept, that is, any concept inasmuch as it is a quality of the soul. On the contrary, logic presupposes the existence of at least two concepts about things because it is not interested in concepts as qualities of the soul, but rather in concepts as related to each other with reference to things. In fact logic demands a multiplicity of concepts because one must be able to say something of inferiors before science can prove any conclusions.

The ambiguity of the expression 'extension and comprehension of concepts' should now be obvious. Taken literally, the expression belongs properly to psychology. If the words 'extension' and 'comprehension' are to have any non-psychological meaning in logic, it would be because somewhere among the many second intentions studied by the logician, some new and more restricted usage must be found. Or again, since the subject of logic is not concepts but the relations between concepts, then extension and comprehension should never be employed to designate concepts but rather to indicate the relationships existing between concepts, or they should not be employed at all. Confusion on this point in a logical text can be taken as a sign of defective knowledge on the part of its author. L'Abbé Lévesque, for example, confuses the two viewpoints when he discusses extension and comprehension in his treatise on psychology.<sup>1</sup> In that text he considers the relations between ideas, a topic which is exclusively proper to logic.

The Port Royalists and their admirers, in speaking of the extension and comprehension of ideas or concepts, displayed a weakened knowledge of logic. Although the Port Royalists were aware that logic studies relations between concepts, yet they attached insufficient importance to such relationships. They treated certain foundations of logic, that is, the concepts, as more important than these relations. As shall be seen more clearly, their lack of respect for the predicables seems to be mirrored in their statement, "This is more than sufficient touching the five universals, which are treated at such length in the schools."<sup>2</sup> Even if the Port Royalists had assigned a proper role to the predicables in logic, still their use of such vocabulary as the 'extension and comprehension of ideas' would continue to be a constant source of confusion to the neophyte in logic. Basing himself on such an expression, a beginner in logic cannot be expected to discern the fine nuances which separate psychology from logic.

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1. Cf. L'Abbé LÉVESQUE, *Précis de Philosophie* (Paris: Ancienne Librairie Poussielgue, 1913), Vol. I, p.251. He also mentions extension and comprehension in Vol. II, pp.12-14.

2. Antoine ARNAULD et M. NICOLE, *op. cit.*, Première Parie, c.7, p.62.

## IV. EXTENSION AND COMPREHENSION IN LOGIC

Now that the distinction between psychology and logic has been set forth, a proper way to use 'extension' and 'comprehension' in a strictly logical setting can be discussed in which these two words will have meaning with reference to second intentions. The best way to proceed would be by looking at the purpose and divisions of logic, and then the three operations of the intellect in reverse order.

A. *Extension and comprehension with reference to the purpose and divisions of logic*

At this point it should not be forgotten that certain logicians have attempted to divide logic into a logic of extension and a logic of comprehension (intension).<sup>1</sup> Whether logic is so divided on the basis of these particular aspects (v.g., extension and comprehension) will not be manifest until we consider the purpose of logic itself.

Since it may be said that logic is utilized by the philosopher of nature, the mathematician, and the metaphysician, the total ulterior end of logic is science. This total ultimate end embraces the attainment of both the incomplex and the complex unknown. The philosopher of nature needs the instrument of attaining the incomplex and complex unknown objects in order to grasp reality in nature: the mathematician also relies on logic for clarity in his grasping of the formal properties of quantity; and the metaphysician needs logic to understand the properties of all beings.

The unity of logic, a speculative and liberal art, is derived from its end. As an art, the whole of logic may be divided into two parts according as the unknown object of research is incomplex or complex. The perfect attainment of the end of logic presupposes a threefold operation on the part of man's reason, and it is this threefold operation which establishes the division of the subject matter of the science of logic. Since Aristotle actually uses the distinction of the incomplex and complex in his treatise *On The Soul* by dividing the activity of the intellect into two radically distinct operations, the divisions of logic according to the operations of reason need only be discussed here.<sup>2</sup> Furthermore, it should not be forgotten that St. Thomas makes explicit the thought of Aristotle when he points out that this second

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1. Cf. Joseph T. CLARK, *Conventional Logic and Modern Logic* (Woodstock, Md.: Woodstock College Press, 1952), p.11; Clarence I. LEWIS, "Notes on the Logic of Intension," *Structure, Method, And Meaning: Essays in Honor of Henry M. Sheffer* (New York: Liberal Arts Press, 1951), pp.25-26.

2. The division of logic into formal and material need not detain us. For a detailed explanation of such a division propounded by John of St. Thomas and others, consult: Thomas McGOVERN, *The Division of Logic* (Québec: Librairie Philosophique M. Doyon, 1956).



operation embraces what in modern Thomistic manuals are called the second and third operations.<sup>1</sup>

The objects which form the basis for the division of logic as an art, namely the incomplex and complex unknown, are outside the realm of logic. And similarly the objects which form the basis for the division of logic as a science, namely the three operations of the intellect, are also outside the domain of logic. Therefore, if logic should be divided according to extension and comprehension, then these two words ought to name things outside of logic. Since Father Clarke's division of logic into one of extension and one of comprehension does not name things outside of logic, it is faulty.

*B. Extension and comprehension with reference to the third operation*

At this point the discussion can be restricted to an adverse argument. In an objection posited by St. Thomas, the word 'comprehension' is employed both with reference to definitions and to syllogisms. This is strange because it would mean that comprehension is proper to the logic of the third operation as well as to the logic of the first operation. Since the third operation is more directly ordained to the total ulterior end of logic, the meaning of the word 'comprehension' in reference to syllogisms should be discussed first. But before such discussion is undertaken, it may be well to explain briefly the third operation.

The third act of our intellect consists in a process of moving from a first element to a third element by means of a middle element because "to reason is to advance from one thing understood to another in order to know an intelligible truth."<sup>1</sup> In this process of reasoning, one moves in thought from knowledge already possessed to something new, or from something previously known in an imperfect way to a possession of it in a more perfect way. Is comprehension intimately and properly linked to this process of reasoning? Or does it belong equally to the third operation and the first operation? While reading an objection in which St. Thomas applies the word 'comprehension' to demonstration, a process of reasoning which belongs to the third operation of the intellect, the reader should again substitute in his own mind the words 'to grasp completely' every time the verb form 'to comprehend' appears in the translation.

Besides, just as the most perfect way of knowing complex things is to know them by demonstration, so the most perfect way of knowing incomplex things is to know what they are. But every complex thing that is known by demonstration is comprehended. Therefore, everything concerning which the essence is known is comprehended. But those who

1. Cf. *In I Periherm.*, Prooem., n.1.

2. *Ia*, q.79, a.8. Cf. *In I Post. Anal.*, Prooem., n.4.

see God through His essence have a quidditative knowledge about Him, since to know what a thing is, is nothing other than to know the essence of the thing. Therefore, angels comprehend the divine essence.<sup>1</sup>

In this passage, the verb form 'to comprehend' is used properly in two ways: there is a direct use and a derivative use of the word. The direct usage is found in the first operation of the intellect. The derivative usage, which presupposes a prior use in the first operation, is found in the third operation. St. Thomas responds to the objection by declaring that before anything can be comprehended, its definition (matter which comprises part of the first operation) must itself be comprehended.

A thing is comprehended whose definition is known if only the definition itself is comprehended. But just as it is possible to know a thing without comprehension, so it is possible to know the thing itself without comprehension; and so the thing itself remains uncomprehended. But the angel, although he may see in some manner what is God, nevertheless he does not comprehend this.<sup>2</sup>

In a long passage of the *Posterior Analytics*, Aristotle offers an example of extension in the third operation when he discusses the variables of syllogistic reasoning. But again the discussion derives basically from genus and species in the first operation. In this passage<sup>3</sup> the verb 'extend' occurs only once. But the Latin text of Aristotle contains several other words which are synonymous with the verb *extendere*: v.g., *esse in plus* (to be wider), *excellere* (to surpass — again with reference to extension), and *excedere* (to exceed, that is, to be wider or to have a greater extension). One should note especially that the words 'in plus' are used four different times.

In the original Greek text, this same passage contains the verb *παρεκτείνειν*<sup>4</sup> which is translated by the Latin verb *extendere*. The Greek word means 'to stretch out' or 'to extend.' It is translated into Latin as "*logice, eundem habere ambitum*"<sup>5</sup> (logically, to have the same extension). Aristotle also employs the words *ἐπιπλέον* with the verb *παρεκτείνειν*. This expression is translated by the Latin words "*latiorem ambitum habere*"<sup>6</sup> (to have a wider extension). *Ἐπιπλέον* is also translated by the Latin words 'in plus' which mean 'to be in more' or 'to be wider.'

1. *De Ver.*, q.8, a.2, obj. 4.

2. *Ibid.*

3. *Post. Anal.*, II, c.17, 99 a 17-36.

4. ARISTOTELIS, *Opera Omnia* (Parisiis: Didot et Sociis, 1627), Vol. I, c.14, 99, 47, p.169.

5. H. BONITZ, *Index Aristotelis* (Secunda editio: Graz: Akademische Druck U. Verlagsanstalt, 1955), p.568.

6. *Ibid.*

In lines 99, 33-34, Aristotle uses the verb ὑπάρχειν which is translated by the Latin word *excedere*. In the logical sense, the word signifies "*maiozem ambitum habere*"<sup>1</sup> (to have a greater extension). In line 99, 42, the verb ὑπάρχειν means "*esse in eius ambitu*"<sup>2</sup> (to be in its extension).

Aristotle reduces this problem of relating the cause, effect and subject to the genus which he considers to be the first universal. Hence the problem of extension is not one of the third operation, but is rooted fundamentally in the genus and the first operation of the intellect.

In his *Commentary* on this particular Aristotelian text, St. Thomas utilizes the expression *in plus* five times and the verb *excedere* thrice to convey the meaning of Aristotle with reference to extension.<sup>3</sup> In still another lesson, St. Thomas employs *in plus* nine times<sup>4</sup> and *excedere* twice.<sup>5</sup>

If 'comprehension' can be used in the third operation of the intellect, but only by presupposing a prior use in the first operation, perhaps if the same is true for 'extension,' we shall have proved that the two words are correlatives — wherever one is found, so will be found the other. Here is an example of extension in the *Posterior Analytics* which presupposes a prior use with reference to genus in the first operation.

Therefore, of those things which are always present in any one thing, certain ones are extended in more: not, however, outside the genus: but I say in more to be whatever are present indeed in any one thing universally, and truly in others.<sup>6</sup>

Because Aristotle confines 'extension' to the genus (a relation of the first operation), the word is employed here in its direct and not derivative usage.

Since extension and comprehension are found in the third operation of the mind only derivatively, are modern logicians correct when they speak about the 'extension and comprehension of terms'??<sup>7</sup>

1. *Ibid.*, p.792.

2. *Ibid.*, p.789.

3. Cf. *In II Post. Anal.*, lect.19, n.578-79.

4. *Ibid.*, lect.13, n.529, 530, 532, 533, 535.

5. *Ibid.*, n.532.

6. *Post. Anal.*, II, c.13, 96a 24-26. An ancient version of Aristotle contains the words *extenduntur in plus*, while the more recent version *latius esse extendunt*. Cf. ST. THOMAS AQUINAS, *Opera Omnia*, Vol. 18, p.208.

7. Cf. among others: William BEST, *A Concise System of Logics* (New York: Printed by Samuel Campbell, 1796), p.16; Levi HEDGE, *Elements Of Logick* (Fourth edition; Boston: Cummings, Hilliard & Co., 1824), p.19; Andrew H. BACHHUBER, *Introduction To Logic* (New York: Appleton-Century-Crofts, Inc., 1957), p.17.

According to Aristotle, the word 'term' signifies the resolution of the premises in a syllogism (part of the third operation): "I call that a term into which the premiss is resolved, i.e. both the predicate and that of which it is predicated, 'being' being added and 'not being' removed, or vice versa."<sup>1</sup>

Therefore, even if modern logicians intend to name an activity of the first operation when they refer to the 'extension and comprehension of terms,' still their terminology is ambiguous and reveals a similar carelessness of thought and lack of precision exhibited by logicians who confuse psychology with logic by speaking about the 'extension and comprehension of concepts.' However, this mistake is less serious because to speak of the 'extension and comprehension of terms' is a problem of anticipation. Such logicians intend to speak about the first operation of the intellect.<sup>2</sup>

*C. Extension and comprehension with reference to the second operation*

Since extension and comprehension belong to the third operation only derivatively, may it be said that they are derived from the second act of understanding whereby two concepts are identified or separated from each other? It would seem so because the propositions entering in a syllogism are composed of subjects and predicates. Authors are found who confuse the problem of subject and predicate with that of comprehension and extension.<sup>3</sup> According to them, the problem of comprehension is identified with the predicate being contained in the subject, and the problem of extension is confused with the subject being contained in the predicate. Subject and predicate pertain to the second operation of reason.

There are, however, *three* acts of reason . . . But the *second* operation of the intellect is composition or division of the intellect in which there is now the true or false.<sup>4</sup>

1. *Prior Anal.*, I, c.1, 24b 16-17. Cf. ST. THOMAS, *In I Periherm.*, lect.1, n.5.

2. For an interesting and correct use of the word 'extension' in which it is clearly shown how the third operation of the intellect presupposes universal predicability, consult Thomas McGovern's *The Division of Logic*, pp.126-27. "The Middle, in other words, is contained within the extension of one of the extremes, while containing the other within its own" (p.127). Father McGovern also quotes St. Albert who explains how this part of logic names things by analogy to continuous quantity.

3. Cf. among others: Louis COUTURAT, *La Logique de Leibniz* (Hildesheim: Georg Olms Verlagsbuchhandlung, 1961), p.444; Francis BOWEN, *A Treatise On Logic, Or, The Laws Of Pure Thought* (Cambridge: Sever And Francis, 1865), pp.67-68; John RICKABY, *The First Principles Of Knowledge* (Fourth edition; New York: Longmans, Green, And Co., 1901), p.18.

4. *In Post. Anal.*, Prooem., n.4. Cf. *De Ver.*, q.14, a.1; ARISTOTLE, *On Interpretation*, c.1, 16a 10-11; *In I Periherm.*, lect.3, n.24-25.

This act of affirming or denying by stating that a thing is or is not denotes more than a mere conception of essences; it concerns the very existence of a thing. Hence one may speak of a concept such as 'a stick with one end,' but one may not make a valid statement that 'a stick with one end is possible.' Although logic treats of true and false enunciations,<sup>1</sup> it does not treat of true or false concepts because the product of the first operation, namely, the concept, does not say anything about the existence of a thing. It is only in the product of the second operation, namely the enunciation, composed of subject and predicate, that one finds truth or falsity following upon the declaration in the intellect that something exists in reality. One must remember that what is being considered in an enunciation is not two concepts, but either two realities, or one reality under two aspects, which are either composed or divided. St. Thomas explains this second operation of the mind in the following manner:

But the second operation concerns the very existence of a thing, which results from the union of the principles of a thing in composites, or, as in simple substances, it accompanies its simple nature. And because the truth of the intellect is from the fact that it conforms to a thing, it is evident that according to this second operation, the intellect cannot truly abstract what has been joined in reality, because in abstracting a separation would be signified according to the very existence of the thing, just as if I abstract man from whiteness by saying: 'man is not white,' I signify that there is a separation in reality. Consequently, if according to reality man and whiteness are not separated, the intellect will be false. By this operation, therefore, the intellect can truly abstract only those things which are separated according to reality . . .<sup>2</sup>

Some modern logicians speak of a judgment of extension whereby the subject is in the predicate because the predicate includes more objects than the subject, and a judgment of comprehension or intension whereby the predicate is in the subject because the subject embraces more attributes than the predicate. Though logicians are naming certain results or effects whose cause is in the first operation, they do not seem to make it clear that in every enunciation and in every subject and predicate there is a problem of extension and comprehension. Extension and comprehension can be applied to this second act of understanding only in a derivative sense, because only in an enunciation can the total possible extension and comprehension be *de facto* limited to a particular context. Therefore, if extension and comprehension are used with reference to second intentions as explained before, the proper *locus* for determining their role is within the first

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1. Judgment names a perfection of knowledge which is consequent to the act of reasoning. It is the result of an enunciation.

2. *In De Trin.*, q.5, a.3. Cf. *In III De Anima*, lect.II, n.747; *De Ver.*, q.14, a.1.

operation of the mind. In other words, the supposition of an enunciation presupposes its meaning.

By way of anticipation it may be said that simple apprehension expresses its intelligible content in the form of a concept or idea because "one act of the intellect is the understanding of indivisible or incomplex things according to which one conceives what a thing is."<sup>1</sup> For example, one may have a concept of a 'river,' 'mountain,' or 'valley.' This act of simple apprehension does not involve any judgment or enunciation. Something is conceived without affirming or denying anything about it.<sup>2</sup> It is an act of the intellect knowing something. This act of the mind tells us only what a thing is rather than that it exists:

the first operation is indeed concerned with the very nature of the thing according to which any understood thing holds some grade among beings, whether it be a complete thing, as any whole, or whether it be an incomplete thing, as a part or accident.<sup>3</sup>

Nor does this operation entail any error because "... simple objects are neither true nor false, and because the intellect is not deceived in that which a thing is . . ."<sup>4</sup>

If 'extension' and 'comprehension' are found properly in the logic of the first operation, and found conjointly in every enunciation, further evidence is seen why it would be ridiculous to have a logic of extension and a logic of comprehension. This would mean that every enunciation requires two logics: one of extension and one of comprehension. Such a position seems to destroy the *per se* unity of an enunciation. Needless to say, such a division has nothing to do with the expression 'extension and comprehension' which is derived from the *Port Royal Logic*.

#### D. *Extension and comprehension with reference to the first operation*

In the course of studying the first operation of the mind, the second intentions which should be given principal consideration are the 'predicaments' and the 'predicables' because they are necessary tools for the formulation of definitions and the execution of divisions. The predicaments are related to the predicables as matter is related to form. In nature, matter is ordained to form, but as the less dignified to the more dignified. But in the case of certain liberal arts, form is ordained to matter, as the less dignified to the more dignified; and in this part of logic, the predicables as form are ordained to the

1. *In I Post. Anal.*, Prooem., n.4.

2. Cf. *De Pot.*, q.8, a.1.

3. *In De Trin.*, q.5, a.3.

4. *In III De Anima*, lect.II, n.746. Cf. ARISTOTLE, *On The Soul*, III, c.6, 430 a 26-28.



predicaments as matter as to something more dignified. The predicaments will be considered first because they are more dignified and closer to the end of logic than the predicables.

*i) The predicaments.* Some logicians classify the predicaments as first intentions instead of second intentions. Their error is caused by the fact that they neglect to distinguish between modes of being and modes of predicating (*modi praedicandi*).

It must be known that being is not divided univocally into the predicaments, as genus into species, but according to the diverse mode of being. But the modes of being are proportionate to the modes of predicating. For by predicating anything of any other, we say that this is that: whence the ten genera of being are said to be the ten predicaments.<sup>1</sup>

Although the modes of being are proportionate to the modes of predicating, the former are first intentions belonging to metaphysics, while the latter are second intentions belonging to logic. Hence if one speaks of a first intention as a predicament, he is in fact naming a mode of being, even though the reason for the name is found in the intellect. Here our interest is confined to a predicament as a mode of predication, that is, as a second intention on logic.

In order that anything be predicated of another, it must be, first of all, universal. At this point a clear understanding of the use of the word 'universal' is necessary.<sup>2</sup> The word 'universal' can be considered in two different ways: and consequent upon the first way, it will be used with reference to both the predicaments and the predicables. In the first way, the word 'universal' can be used to name a common nature when it underlies an intention of universality, that is, a substitute mode of existence by the mind. For example, something can be ascribed to this common nature accidentally by reason of the thing in which it exists. Thus when we say that a man is 'white,' white may be considered substantial because it exists in a substance and yet it is only accidentally substantial.

In still another way, the word 'universal' can be used with reference to the common nature itself without any consideration being given to a mode of existence. Nothing is true of it except what belongs to it as such. Thus it pertains to man to be 'rational,' 'animal,' 'sentient,' 'living,' and whatever else the definition of man includes, whereas the accidents 'tall,' 'young,' 'American,' etc., which are not included in the concept of man, do not belong to man as man.

This common nature has a twofold existence: materially in individuals, and immaterially in the intellect. In both modes of existence,

1. ST. THOMAS, *In III Phys.*, lect.5, n.322.

2. This paragraph and the next two are a paraphrase of St. Thomas, *In II De Anima*, lect.12, n.378. Cf. *In VII Metaph.*, lect.13, n.1570; *Ia IIae*, q.29, a.6; *Ia*, q.85, a.3, ad 1.

the common nature which is called a universal is found to exist according to the peculiar properties of that which gives it existence. When this common nature is considered as existing in particular things, that is, with the intention of universality proper to the mind left aside, the universal is said to exist in the particular. Otherwise, one could not say that the nature of man exists in the individual. The intention of universality is not found in the particular because it is opposed to the individuating power of prime matter. When the common nature assumes a mode of existence in and provided by the intellect, it takes on an intention of universality because of the abstractive power of the intellect. In this case it may be said that the universal nature exists in the universal.<sup>1</sup>

Perhaps the thought of St. Thomas in the paraphrase will be clearer if summarized in an outline.

(1) A common nature considered with reference to a universal mode of existence may be called a universal.<sup>2</sup>

(2) The word 'universal' can also be considered with reference to the common nature without any regard to the mode of existence either particular or universal.

The universal mode of existence which is implied by the intention of universality can in turn be considered in two ways: (1) from the viewpoint of the intellect which actually makes the existence, or (2) from the viewpoint of the common nature which receives the existence. The necessity for such a distinction is seen to be implied when the citation from the treatise *On The Physics* is contrasted with that *On The Soul*. However, to make the implication clear, certain grammatical observations are necessary.

The Latin expression *modus praedicandi* (mode of predicating) is proportionally equivocal because it can signify either the activity of predicating or the passivity of being predicated. The gerund form<sup>3</sup> *praedicandi* may be interpreted as the genitive case of either the active infinitive *praedicare* (the activity of predicating) or the passive infinitive *praedicari* (the passivity of being predicated). Hence *modus praedicandi* is analogical because according to the context it may have an active or a passive signification.

It may be well to consider, for example, other Latin verbs such as *amo* and *tango*: both verbs have an active infinitive form (*amare*: to love; *tangere*: to touch) and a passive infinitive form (*amari*: to be loved; *tangeri*: to be touched). The infinitive forms of these two verbs do not create a problem, but as soon as the active infinitive

1. Cf. ST. THOMAS, *Ia*, q.85, a.3, ad 1.

2. The first meaning will be used in the next section of this study.

3. Cf. ST. THOMAS, *In I Sent.*, d.7, q.2, a.1.



*amare* and *tangere* are used as nouns, their genitive forms *amandi* and *tangendi* give rise to confusion. *Amandi* as the genitive of *amare* means 'of loving actively,' and as the genitive of *amari* means 'of being loved.' Likewise, *tangendi*, as the genitive of *tangere* means 'of touching actively,' and as the genitive of *tangeri* means 'of being touched.' So while there is precision in the Latin infinitive forms, there is ambiguity in the gerund forms since the latter purport two meanings: one active and one passive.

In English, clarity of expression is also lacking. The English infinitive is neither active nor passive. The infinitive is generic inasmuch as it has indifferently an active or a passive meaning. If one considers the infinitive forms of the verbs 'to read' and 'to do' outside of a sentence structure, their meaning is ambiguous since they can denote either activity or passivity. Of course, this ambiguity could be eliminated if a compound tense were introduced: v.g., 'to be read' or 'to be done.' But we are only interested here in the simple tenses as we compare the Latin and English infinitive and gerund forms. In context the infinitives 'to read,' and 'to do' may possess two meanings. If one declares, 'I am going to read a book,' the infinitive is active. But if one states, 'I have a book to read,' the infinitive is passive because the sentence really means 'I have a book to be read.' The infinitive 'to do' also has an active sense in the sentence 'I am going to do some chores,' and a passive nuance in the sentence 'I have some chores to do,' that is, 'some chores to be done.'

English present participles are likewise equivocal. 'Cooking' and 'selling' may be either active or passive in meaning depending upon their context. In the sentences 'his wife is cooking dinner' and 'he is selling books,' the participial forms 'cooking' and 'selling' are active; but in the sentences 'the food is cooking slowly' and 'the book is selling well,' the present participles are passive in meaning.

The same ambiguity exists in the English gerunds. If one refers to the 'process of ageing,' the gerund may denote either an active meaning, namely, 'the process of ageing wine,' or a passive sense, namely, 'the process of becoming older.' The same equivocation can be found in the expression 'the act of graying.' The gerund 'graying' may signify either the active meaning of coloring an object gray, or the passive sense of becoming gray, that is, when it refers to a person's hair.

Similarly, the terminology 'mode of predicating' (*modus praedicandi*) is equivocal because it can be interpreted actively or passively. If one interprets the 'mode of predicating' in an active sense, he names a 'predicable'; but if he construes the 'mode of predicating' in a passive sense (the more accurate expression would be the 'mode of being predicated'), he names a 'predicament.' That is the reason

why St. Albert used the adjective 'predicable' (*praedicabilis*)<sup>1</sup> with a passive meaning to designate a predicament, because predicable means 'that which can be predicated.' At the same time he employed the words *universalis* and *ordinatio praedicabilium* when he referred to the predicables, in order to emphasize the intellectual activity of producing the universal intentions.<sup>2</sup> When the word 'universal' is being used in the intellect from the viewpoint of actually making existence, it is a mode of predicating called the 'predicable.' But when the word 'universal' is being used from the aspect of the common nature receiving existence, it is a mode of predicating called the 'predicament.'

Now that we have examined the two modes of active and passive predication, we shall consider whether or not extension and comprehension are proper to the passive mode of predicating, namely, the predicaments. Such an investigation, whether it yields positive or negative information, will deepen our understanding of extension and comprehension as we proceed to find the basic source of these two properties. Aristotle enumerates ten different ways in which things can be predicated (note the passive form 'can be predicated'). These ways are called by logicians today either the ten categories, predicaments, predicates, or supreme genera.

Expressions which are in no way composite signify substance, quantity, quality, relation, place, time, position, state, action, or affection. To sketch my meaning roughly, examples of substance are 'man' or 'the horse,' of quantity, such terms as 'two cubits long' or 'three cubits long.' . . .<sup>3</sup>

Due to lack of space, only the predicaments of quantity and substance will be considered here: first of all, quantity, because some logicians have recognized 'extension' and 'comprehension' as quantities.<sup>4</sup> They identified extension as an external quantity with the dimension of breadth, and comprehension as an internal quantity with the dimension of depth. These men were inclined to call concepts quantities containing 'under' themselves (extension) and 'in' them-

1. ST. ALBERTUS MAGNUS, *Commentaria In Praedicamenta Aristotelis* (Parisiis: Ludovicus Vivès, 1890), L. II, Tr. 1, c.1, p.2: "... consistit in decem generibus praedicabilium sive praedicamentorum."

2. Cf. ST. ALBERTUS MAGNUS, *De Praedicabilibus* (Québec: Les Presses Universitaires Laval, 1951), L. 1, Tr. II, c.1, p.23.

3. ARISTOTLE, *Categories*, c.4, 1 b 25-29. Cf. ST. THOMAS, *In V Metaph.*, lect.9, n.891-92; *In III Phys.*, lect.5, n.322.

4. Cf. among others: Sir William HAMILTON, *Lectures on Logic* (Third Edition, revised; Edinburgh and London: William Blackwood and Sons, 1874), Vol. I, pp.140-41; Augustus DE MORGAN, *Syllabus Of A Proposed System Of Logic* (London: Walton and Maberly, 1860), p.61; Wilhelm TRAUOGOTT, *System der theoretischen Philosophie* (Königsberg: A. W. Unzer, 1819), p.76.

selves (comprehension) certain attributes. In view of their way of speaking, it would seem at first glance that the words 'extension' and 'comprehension' belong to the predicament or category of quantity. According to Aristotle, quantity is either continuous or discrete.<sup>1</sup> After citing examples of these two species of quantity, he remarks that "strictly speaking, only the things which I have mentioned belong to the category of quantity: everything else that is called quantitative is a quantity in a secondary sense."<sup>2</sup> In other words, if extension and comprehension are used within the limitations of the predicament 'quantity,' their meaning is restricted to their first univocal usage. But such a restriction is not adequate to the total usage of these two words in logic because no allowance would be made for their analogical usage with reference to virtual quantity. Consequently, if and when extension and comprehension are employed in these analogical senses, they cannot belong properly to the predicament of quantity.

For this to be clear, it should be remembered that the first meaning of extension is synonymous with that of quantity. But when one declares that the genus of quantity has a greater extension than a species of quantity (v.g., a triangle), then the word 'extension' has a non-quantitative sense.

When the English logician, Sir William Hamilton, said that "a concept is, therefore, necessarily a quantity,"<sup>3</sup> he made a very important observation on the methodology proper to logic. If this passage is understood to mean that concepts are to be univocally placed under the predicament of 'quantity,' the meaning is misconstrued. But if the statement is interpreted to mean that concepts are virtual quantities and that their properties, second intentions, are to be named and analyzed as properties of virtual quantities, such an interpretation is in accord with the manner in which man is obliged to analyse immaterial realities.

Thus the usage of extension and comprehension, which is the subject of this study, is not proper to the predicament of 'quantity.' If the accidental category of quantity cannot, it would seem likely that no other predicamental accident could found the proper logical usage of extension and comprehension. Therefore, no further analysis of the other eight categories of accident will be given here.

The category of 'substance' should now be treated. Because substance may be extended to, or may contain under it, such beings as body, living body, animal, man and individuals, it may be inquired whether the predicament of 'substance' is the source or cause of extension and comprehension.

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1. Cf. *Categories*, c.6, 5 a 15-36.

2. *Ibid.*, c.6, 5 a 37-38.

3. Sir William HAMILTON, *op. cit.*, p.141.

Substance indeed, is itself genus, under this is body, under body animated body, under which is animal, under animal rational animal, under which is man, under man Socrates, Plato, and men particularly.<sup>1</sup>

Substance cannot be regarded as quantity in the univocal sense of the word because the first substance is neither material nor immaterial. When, however, the genus of 'substance' is extended to two species, the same situation prevails as when the genus 'quantity' is extended to two species. This extension of substance, which is generic, to the species is not due to its nature as a predicament, but rather to the predicables which organize it. Therefore, the predicament 'substance' cannot be the cause of extension and comprehension.

Extension and comprehension are not, first of all, concerned with the relationships involved in the passivity of that which is predicated, but with the relationship involved in the activity of predicating. Consequently, extension and comprehension cannot be immediate properties of the predicaments which are modes of being predicated; instead, they must belong to the predicables which are modes of organizing the activity of predicating.

*ii) The predicables.* When something is attributed to another thing, that something is said to be predicated about that thing. That thing about which something may be said is called the subject, while that something which may be said about the subject is known as the predicate. The different ways in which a predicate can be related to a subject are called predicables.<sup>2</sup> All predicables are universals because 'being said of several things' implies a certain universality or repeatability, "And thus a universal is that which is apt to be in many and to be predicated of many."<sup>3</sup> St. Albert makes clear why the predicables are five in number, and only five. The word 'universal'<sup>2</sup> can be used with reference to either the essence of a subject of which it is predicated, or something which is not the essence. If it signifies the essence, it may express the whole formal essence (species, v.g., man), an essential part in inchoation (genus, v.g., animal), or an essential part in act (difference, v.g., rational). If it designates something which is not the essence, it may express something which is necessarily connected to the essence of the subject

1. PORPHYRY, "The Introduction of Porphyry," *The Organon, Or Logical Treatises Of Aristotle*, trans. Octavius Freire Owen (London: Henry G. Bohn, 1853), Vol. II, p.614.

2. ST. ALBERTUS MAGNUS, *De Praedicabilibus* (Quebec: Les Presses Universitaires Laval, 1951), L. I, Tr. II, c.1, p.23: "Et sic universale est, quod de sua aptitudine est in multis et de multis." Aristotle defines the universal in *Metaph.*, VII, c.13, 1038 b 11: "that is called universal which is such as to belong to more than one thing."

3. Here the word 'universal' is used according to the first meaning which has already been explained.

(property, v.g., risibility), or something which is only contingently connected to that essence (accident, v.g., tall).

But the universal thus taken as it is a predicable that is in many and of many, either it is present essentially or accidentally: whether as an essence or as an accident. If it is present as an essence: either it is present as a whole essence or as an essential part. If it is present as a total formal essence, it is evident that it is a species, because species is the whole formal being of individuals concerning which it is predicated: because whatever comes after the species comes from matter or from individuating elements. If, however, as an essential part; then it is present either after the manner of a potency in which there is some inchoate sort of being, or it is present after the manner of an act in which there is some completely actuated being. And in the first way it is a genus, but in the latter way it is a difference. But if it is present as an accident: either it is present as an accident of nature which is caused and flows from the aptitude of its nature, or as a common accident which is an accident of the individual. And in the first way it is the property, but in the second way it is called the accident.<sup>1</sup>

In the first sentence of this paragraph, St. Albert presents one word, namely, the word 'universal' and gives it two meanings by considering it from two different aspects: (1) as a predicament, when he says "it is a predicable that is in many and of many," and (2) as a predicable when he adds the phrase, "either it is present essentially or accidentally." The reader is cautioned to remember that St. Albert employs the words *ordinatio praedicabilium* (*universale id quo*) to denote the predicables and the word *praedicabilia* (*universale id quod*) to signify the predicaments.

The five predicables are defined by Porphyry in his *Isagoge*. According to the order of knowledge, Porphyry defines them in the following sequence: genus, species, difference, property and accident. If, however, one follows the order of things in nature, difference should precede the species because the former is constitutive of the latter. Here the definitions of Porphyry will be considered in reverse order beginning with the common accident in order to ascertain in which predicable or predicables 'extension' and 'comprehension' are rooted. Porphyry offers three definitions for accident.

(1) Accident is that which is present and absent without the destruction of its subject.

(2) Accident is that which may be present and not present to the same thing.

(3) Also that which is neither genus, nor difference, nor species, nor property, yet is always inherent in a subject.<sup>2</sup>

1. ST. ALBERTUS MAGNUS, *De Praedicabilibus*, L. I, Tr. II, c.1, p.24. Cf. *ibid.*, c.9, p.55 a.

2. PORPHYRY, "The Introduction Of Porphyry." Cf. *The Organon, Or Logical Treatises Of Aristotle*, trans. Octavius Freire Owen (London: Henry G. Bohn, 1853), Vol. II, c.5, pp.623-624.



In his *Topics*, Aristotle offers a negative and affirmative definition of the predicate 'accident' in the same sentence.

Accident, again, is that which is not any of these, neither definition, nor property, nor genus, yet it is present with a thing, and is that which may possibly be present with some one and the same thing and may not be present . . .<sup>1</sup>

Here the predicate 'accident' presupposes a knowledge of the predicable 'accident'; therefore, if extension and comprehension are related to 'accident,' it should be rather to the predicable than to the predicate.

Although several logicians have considered extension or comprehension in reference to the predicable 'accident,'<sup>2</sup> these words could be ascribed to 'accident' only in a derivative and not a direct sense; for the law of inverse ratio (namely, the greater the comprehension, the lesser the extension, and vice versa) does not hold sway, in fact it becomes utterly ridiculous. Suppose, for example, one considers the modern medical notion of 'syndrome' in which a group of signs and symptoms occur together and characterize a certain disease. Occasionally such diseases do appear and they are not characterized by all of the signs and symptoms. Hence the law of inverse ratio does not apply to the predicable 'accident.' If one still wishes to speak of extension and comprehension of 'accident,' it must be only in a derived sense inasmuch as these words are employed in a more direct sense with reference to one or to several of the other predicables.

Four definitions are given by Porphyry for the predicable 'property.'

(1) For it is that which happens to some one species alone, though not to every (individual of that species), as to a man to heal, or to geometrize;

(2) that also which happens to a whole species, though not to that alone, as to man to be a biped;

(3) that again, which happens to a species alone, and to every (individual of it), and at a certain time, as to every man to become grey in old age;

(4) in the fourth place, it is that in which it concurs (to happen) to one species alone, and to every (individual of it), and always, as risibility to man; for though he does not always laugh, yet he is said to be risible,

1. ARISTOTLE, "The Topics," I, c.5. Cf. *The Organon Or Logical Treatises Of Aristotle*, trans. Octavius Freire Owen (London: G. Bell and Sons, Limited, 1910), Vol. II, p. 365.

2. Cf. among others: James H. HYSLOP, *The Elements Of Logic* (New York: Charles Scribner's Sons, 1892), p.72; F. H. BRADLEY, *The Principles of Logic* (Second edition; London: Oxford University Press, 1928), Vol. I, pp.178-79; L. Susan STEBBING, *A Modern Elementary Logic* (London: Methuen & Co., Ltd., 1943), p.104.

not from his always laughing, but from being naturally adapted to laugh, and this is always inherent in him, in the same way as neighing in a horse.<sup>1</sup>

Aristotle defines the predicate 'property' in a similar way: "Property, indeed, is that which does not show what a thing is but is present to it alone, and reciprocates with the thing."<sup>2</sup> It should be noticed that Porphyry and Aristotle do not distinguish property from accident as flowing necessarily from the essence, but rather as coextensive and convertible with its subject. By the word 'subject' is meant 'species' because when Porphyry compares property to species, he declares that "it is common then to species and property, to be reciprocally predicated of each other, . . ."<sup>3</sup> Although property and species have an equal extension, they do not have an equal comprehension. When one speaks of the species 'man,' he does not speak of 'risibility.' Yet the property 'risibility' is implied because all men have a natural capacity to laugh. In this case, the property 'risibility' belongs to man in potency. But when one says that 'man is risible,' the property becomes actual. Hence the property has a greater comprehension than the species because the more actual and less potential a being, the more determined and knowable it is.

Porphyry proposes five definitions for the predicable 'difference.'

- (1) Difference is that by which species exceeds genus . . .
- (2) Difference is that which is predicated of many things differing in species in answer to the question, of what kind a thing is . . .
- (3) Difference is what is naturally adapted to separate things which are under the same genus, . . .
- (4) Difference is that by which each singular thing differs, . . .
- (5) They however who more nicely discuss what pertains to difference, say that it is not any casual thing dividing those under the same genus, but such as contributes to the essence, and to the definition of the essence of a thing, and which is part of the thing.<sup>4</sup>

According to Aristotle, the difference is the determining part of the species: "every specific difference united with genus produces species . . ."<sup>5</sup> Although the difference, like the property, possesses a certain extension and comprehension, the ultimate specific difference is coextensive with the species. Since the species embraces explicitly the genus and difference, it contains more comprehension than the difference inasmuch as the latter is not explicitly referred to the genus.

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1. PORPHYRY, *op. cit.*, c.4, pp.622-23.

2. ARISTOTLE, *Top.*, I, c.5, p.364.

3. PORPHYRY, *op. cit.*, c.15, p.631.

4. PORPHYRY, *op. cit.*, c.3, pp.621-622.

5. ARISTOTLE, *Top.*, VI, c.6, p.480.

As a final remark on these three predicables, it is curious to observe that 'accident,' 'property' and 'difference,' which do not directly imply extension and comprehension, are expressed for the most part by those grammatical forms which today are called adjectives, and which the ancients referred to as adjective nouns. The time has now arrived to focus attention on those two predicables (species and genus) which are expressed by substantive nouns.<sup>1</sup> Porphyry points out that the word 'species' is employed in three different ways. However, only the second and third meanings are proper to logic.

(1) Species indeed is predicated of every form ...

(2) Still that is called species also, which is under the genus stated, ...

(3) Species is what is arranged under genus, and of which genus is predicated in reply to what a thing is: moreover, thus species is what is predicated of many things differing in number, in reply to what a thing is.<sup>2</sup>

Before considering whether extension and comprehension belong properly to species or to genus, or whether they belong to both predicables, it may be well to present, first of all, the definitions offered by Porphyry and Aristotle concerning the genus. The reality defined in the third usage of the word 'genus' in the *Isagoge* is that sort of genus proper to logic. In its third signification, Porphyry has already been seen to declare:

Again, in another way that is denominated genus to which the species is subject, called perhaps from the similitude of these; for such a genus is a certain principle of things under it, and seems also to comprehend all the multitude under itself. As then, genus is predicated triply, the consideration by philosophers is concerning the third, which also they explain by description, when they say that genus is that which is predicated of many things differing in species, in answer to what a thing is, e.g. animal.<sup>3</sup>

Genus is also defined as "that which is predicated of many things differing in species, in (answer to) what a thing is; ..."<sup>4</sup>

From the interpretation of these definitions, three important facts can be discerned: (1) extension belongs to genus; (2) extension belongs also to species; and (3) the extension of the genus is greater than the extension of the species.

The extension of the genus is attested by Aristotle when he asserts that genus is predicated of 'many things' which differ in species.<sup>5</sup>

1. This statement should suffice to refute those logicians who maintain that extension is signified by nouns and comprehension by adjectives. Cf. Charles Gray SHAW, *Logic In Theory And Practice* (London: Sir Isaac Pitman & Sons, Ltd., 1935), p.45.

2. PORPHYRY, *op. cit.*, c.1, p.613.

3. *Ibid.*, c.2, pp.611-12.

4. ARISTOTLE, *Top.*, I, c.5, p.364.

5. Cf. *ibid.*



The very notion of extension implies a relation of one to many, or a 'stretching out' (extension), of one to embrace many. The preceding statement may be paraphrased by declaring that the extension of genus is a relation of genus to its proper species, or a 'stretching out' of genus to those species, and consequently to individuals.

This logical relation of one to many is prepared for by way of similitude when Porphyry defines the first non-logical use of genus as "a collection of certain things subsisting in a certain respect relatively to one thing, and to each other, ..." <sup>1</sup> In this example, genus designates a relation of many to one (*multa ad unum*) inasmuch as many individuals form one group related to one head or ancestor. The notion of extension is attached to genus in this similitude because the individuals of a tribe or clan may be greater or lesser in number, and because such collection implies at least two individuals.

The extension of the genus is further exemplified by Porphyry in his second non-logical usage of the word 'genus.'

Again, after another manner also, the principle of the generation of every one is called genus, whether from the generator or from the place in which a person is generated, ... <sup>2</sup>

According to this similitude, the father is recognized as a genus and is collective if he has at least two children. From the viewpoint of the children, there is the element of plurality or extension. This collective power of the father can be employed as a transition to realize that a logical genus must also have power over two or more species.

Extension is also attributed to species when Aristotle mentions that "of all then of which genus is predicated, it happens that species is also predicated, ..." <sup>3</sup> In other words, inasmuch as predication implies a relation of one to many, species is 'stretched out' to the same individuals to which genus is extended.

The extension of the species is explicitly and actively asserted by Porphyry when he says, "species indeed will always be predicated of the individual, ..." <sup>4</sup> and passively when he states, "the individual is comprehended in the species, ..." <sup>5</sup> In the active sense, it may be said that species is 'stretched out' (extended) to one or more individuals — it is a relation of one to many. Passively, the individual or individuals are contained under the species — it is a relation of many to one.

In his *Metaphysics*, Aristotle offers additional evidence for the logical use of extension when he treats the word 'genus' under the

1. PORPHYRY, *op. cit.*, p.610.

2. *Ibid.*, p.611.

3. ARISTOTLE, *Top.*, IV, c.6, p.438.

4. PORPHYRY, *op. cit.*, p.617.

5. *Ibid.*

formality of a whole;<sup>1</sup> because the relation of whole to parts is basically a problem of extension. As the human intellect relies on the principle that the 'whole is greater than its parts,' so too everything in logic is to be reduced to the principle of quantity and considered as if it were quantitative in nature.

Further, Aristotle accepts and utilizes the greater extension of the genus as a fundamental principle in the *Topics* when he says,

The genus is always more widely extended than the species... Still the element relative to all such is, that the genus is of wider extension than the species and the difference, for difference, also, is predicated of fewer things than the genus.<sup>2</sup>

In other citations, he reiterates the greater extension of the genus when he says, "it is necessary that species should be predicated to a less extent [than genus]";<sup>3</sup> "genus is the most extensively spoken of all"<sup>4</sup>; "the genus is predicated of the species, whereas the species cannot be predicated of the genus."<sup>5</sup>

Porphyrus likewise affirms that genus has a greater extension than the species.

Genus indeed is always predicated of species, and all superior of inferior, but species is neither predicated of its proximate genus, nor of those superior, since it does not reciprocate.<sup>7</sup>

The greater extension of the genus is based on the fact that one genus is predicated of two species as well as of individuals under both species, whereas one species is only predicated of the individuals under itself.

At least, since the superior are always predicated of the inferior, species indeed will always be predicated of the individual, but the genus both of the species and of the individual, ...<sup>8</sup>

The greater extension of the genus is emphasized by contrasting it with all of the other predicables.

1. Cf. ST. THOMAS, *In V Metaph.*, lect.22, n.1119-27.

2. ARISTOTLE, *Top.*, IV, c.1, pp.421-22. When Ross substitutes the word 'denotation' for 'extension,' he seems to falsify the meaning of the text because denotation is in the line of comprehension. Cf. *The Works Of Aristotle*, ed. and trans. W. D. Ross (London: Oxford University Press, 1950), Vol. I.

3. *Ibid.*, c.6, p.438.

4. *Ibid.*, p.482.

5. ARISTOTLE, *Categ.*, c.5, 2b 19-21. Cf. *The Works Of Aristotle*, ed. and trans. W. D. Ross.

7. PORPHYRY, *op. cit.*, c.2, p.616.

8. *Ibid.*, p.617.

Now, it is the property of genus to be predicated of more things than difference, species, property, and accident are, ...<sup>1</sup>

Again, in an explicit manner, the greater extension of the genus is manifested by differentiating genus from species.

...but they differ, because genus indeed comprehends species, but species are comprehended by, and do not comprehend genera, for genus is predicated of more than species.<sup>2</sup>

Finally, Porphyry speaks of genus possessing a greater extension because "genera exceed, from comprehending the species which are under them ..."<sup>3</sup>

Ammonius emphasizes the greater power of the genus when he insists that while the species comprehends or contains individuals, the genus comprehends both species and individuals.<sup>4</sup> Consequently, genus is more extensive than the species and individuals embraced by it, whereas species is only more extensive than the individuals it contains.

It may be concluded that while extension is ascribed to both species and genus, it belongs in the very first instance to the predicable 'genus' which possesses the greater power to comprehend or to contain more things under it, and it then belongs to the predicable 'species' inasmuch as the species participates in the unifying power of the genus.

Although the references to comprehension are found less frequently in the logical texts of Porphyry and Aristotle, still the few that are found suffice to show that comprehension belongs to species and genus. Porphyry speaks about comprehension when he explains how the species exceeds or surpasses the genus: "Difference is that by which species exceed genus ..."<sup>5</sup> In order to associate the words 'exceeds' in the preceding quotation with the notion of comprehension, one must remember that the word 'comprehension' is basically analogical: it can mean 'what is grasped' or 'how many are grasped.' In modern manuals on logic, the word 'comprehension' has been limited to one signification, and that one meaning becomes clear by the use of the word 'exceed.'

The action of grasping or seizing by the mind as an instrument is further clarified when Porphyry speaks of the collective power of the genus (in the sense of how many species are grasped, or seized, or comprehended) and the collective power of the species (in the sense of

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1. *Ibid.*, c.7, p.625.

2. *Ibid.*

3. *Ibid.*, c.8, p.626.

4. AMMONIUS HERMEAE, *In Quinque Porphyrii Voces Commentarium* (Venetiis: Apud Hieronymum Scotum, 1542), p.36.

5. PORPHYRY, *op. cit.*, c.3, p.621.

what is grasped or seized, or comprehended): "for species is collective of the many into one nature, and genus yet more so..."<sup>1</sup>

Aristotle links comprehension to both genus and species when he talks about the species 'partaking' or 'participating' more intensely in a thing than the genus.

The definition of partaking, is to receive the definition of what is participated. Now it is evident that species partake of genera, but not genera of species, since the species accepts the definition of genus, but not genus that of the species.<sup>2</sup>

In this case, the species comprehends or grasps more of the whatness or nature of a thing inasmuch as it contains not only the more remote difference (which qualify the nature of a thing) which the genus contains, but the species also contains the specific difference which constitutes its very nature. For example, the genus 'animal' and the species 'man' contain the differences 'sentient,' 'living,' and 'material,' but only the species 'man' contains the specific difference 'rational.' Hence, as it has been said before, the species participates more intensely in a thing than the genus, that is, it has a greater comprehension than the genus because it grasps or seizes more of the whatness or nature of a thing.

Comprehension is also ascribed to genus and species by the use of the expression 'determinate qualification' (*ἀφορισμὸν*).

The determinate qualification covers a larger field in the case of the genus than in that of the species: he who uses the word 'animal' is herein using a word of wider extension than he who uses the word 'man.'<sup>3</sup>

Thus it seems sound to say in English that both genus and species have comprehension as well as extension. And it also seems safe to declare that genus has greater extension while species possesses greater comprehension. Extension and comprehension, because intrinsic to the definitions of genus and species, can only be manifested, and since they are not properties, they cannot be proved by a *propter quid* demonstration.

#### V. GENERAL SUMMARY

It is difficult to arrive at any conclusions concerning the problem of extension and comprehension in logic if one neglects to explore the various significations of these words in other domains. An examination of the word 'extension' in a non-logical setting reveals four major variations of meaning whereby a transition is made from the

1. *Ibid.*, c.2, p.616.

2. ARISTOTLE, *Top.*, IV, c.1, p.420.

3. ARISTOTLE, *Categ.*, c.3, 3b 21-23.

activity of the stretching out of a material object or the object stretched out, to the agent of the action stretching himself out with reference to local motion, to the stretching out of human emotions and appetites, and ultimately to the capacity of a knowing being to stretch out toward knowable things. A threefold transition occurs with the word 'comprehension.' The word can vary in meaning from the physical activity of grasping a material object, to the activity of the emotions grasping objects, to the activity of the knowing powers, whether sensible or intellectual, grasping knowable objects.

There is a valid usage for these two words in psychology because all knowledge can be spoken of in terms of extension and comprehension. Knowing beings differ from non-knowing beings by virtue of a certain amplitude or extension. Every sense power is by its operation extended to an object and comprehends an object. Nevertheless, in psychology, extension and comprehension pertain to acts of knowledge and do not name second intentions or relations which are proper to logic. For that reason, one is obliged to reject as dangerous the expression 'extension and comprehension of concepts' frequently found in modern logic textbooks.

To ascertain where the distinction between extension and comprehension can be localized in logic, one must be familiar with the purpose and divisions of logic. The end of logic is science which embraces both the incomplex and complex unknown. Perfect attainment of such end presupposes a threefold operation of man's reason. Although extension and comprehension are found in the third operation of reason, they are used there only derivatively. Hence certain modern logicians deserve to be chided when they speak of the 'extension and comprehension of terms' inasmuch as the word 'term' signifies a part of the third operation.

Extension and comprehension also belong to the second operation of reason in a derivative sense. When some modern logicians speak of a judgment of extension whereby the subject is in the predicate, and a judgment of comprehension whereby the predicate is in the subject, they are naming certain results or effects whose cause is in the first operation of the mind. Further, such a position renders absurd the division of logic into one of extension and one of comprehension, a division which would necessitate two logics for every enunciation. This dichotomy would also destroy the demonstrative syllogism which contains extension as well as comprehension.

In the first operation of the mind, one finds two modes of predicating: a passive mode designated by the word 'predicament' and an active mode known by the word 'predicable.' Although some logicians refer to extension as an external quantity and comprehension as an internal quantity, still these two words cannot be ascribed to the predicament 'quantity' because such usage would restrict their meaning to the univocal meaning of dimensive quantity and would make

no allowance for their analogical usage with reference to virtual quantity. Furthermore, extension and comprehension cannot belong to the predicament 'substance' because the extension of substance to two or more species is not due to its nature as a predicament, but rather to the predicables which organize it. Therefore, extension and comprehension are not immediate properties of the predicaments or passive modes of predication; instead, they are properties of the predicables or active modes of predicating.

Some logicians have considered extension and comprehension in reference to the predicable 'accident.' These belong to that predicable solely in a derivative and not direct sense because the law of inverse ratio (namely, the greater the comprehension, the lesser the extension) does not always hold true in such cases. Nor do extension and comprehension belong properly to the predicable 'property' because property and species are equal in extension but unequal in comprehension. Finally, extension and comprehension do not belong directly to the predicable 'difference' since the difference has less comprehension than the species.

Ample evidence is found in the texts of Aristotle and Porphyry to indicate that extension belongs, first of all, to the predicable 'genus' which possesses the greater power to contain more things under it, and, secondly, to the species inasmuch as the species participates in the unifying power of the genus. Those same texts also reveal that while both genus and species possess comprehension as well as extension species has the greater comprehension and genus the greater extension.

A better understanding of this problem of extension and comprehension will be achieved if the student of logic is cognizant of two important facts: (1) Extension and comprehension imply a plurality. When anything is extended (stretched out), it is extended to several or many things. And when anything comprehends (grasps completely), it can likewise comprehend several or many things. (2) The words 'extension' and 'comprehension' are analogical in meaning. Often-times the same word designates different aspects of the same reality. For example, comprehension may sometimes be used to signify the modern notion of extension, namely, the number of things grasped, or it may simply signify what kind of things are grasped. Such usage permits us to conclude that comprehension is more analogical in meaning than extension.

When extension and comprehension are applied to genus, it may be said that genus offers a clear (comprehensive) and more extended (extension) knowledge; when those same words are applied to species, it may be asserted that species offers a clearer (more comprehensive) and less extended (extension) knowledge. In other words, genus has the greater extension and species the greater comprehension.

If the student will take the time to examine many of the modern textbooks on logic, he will discover that a prominent place, and



occasionally an entire chapter, is given to the distinction between extension and comprehension. Frequently this doctrine is introduced in the manuals before the predicables are ever considered, and it is presented in such a manner that the reader would never suspect that extension and comprehension belong to the predicables of genus and species.<sup>1</sup>

Because the discussion of extension and comprehension is badly placed in logical treatises, there is a tendency to magnify the importance of this distinction out of proportion to its real value. Thus Jevons claims, "to anyone desirous of acquiring a thorough command of logical science, nothing is so important as a careful study of the intensive or comprehensive meaning of terms, propositions, and syllogisms."<sup>2</sup> Jolivet also considers the distinction of capital importance for formal logic.<sup>3</sup> And Bachhuber believes that comprehension and extension pervade the whole of logic to such an extent that a thorough and correct understanding of them is imperative if one wishes to establish a solid foundation for logic.<sup>4</sup>

It may be conceded that extension and comprehension are significant, but it must be emphasized that extension and comprehension are important only inasmuch as implied in the very definitions of the predicables. Any logical treatise which includes in its contents a section on extension and comprehension, and yet at the same time excludes the predicables, is badly oriented because extension and comprehension present only two ways in which a predicate may be said of a subject, whereas the predicables present five different modes of predication.

Modern logicians also seem to overlook other important facts: the rules of definition are derived from an understanding of the genus and species. The definition of the genus, for example, is the first proper principle of logic. It is of the utmost necessity to manifest this first principle adequately and properly. But such a task cannot be accomplished unless a study of the predicables is made at the beginning of logic. Many of the errors in logic textbooks could be avoided if this procedure were followed. The old adage certainly rings true in this instance: "*parvum quantitate, magnum virtute.*" Applied here, the

1. Cf. among others: Kenneth F. DOUGHERTY, *Logic* (2nd. Edition; Peekskill, New York: Graymoor Press, 1956), pp.35-37 (comprehension and extension of the concept), pp.55-58 (the predicables); Vincent Edward SMITH, *The Elements Of Logic* (Milwaukee: The Bruce Publishing Company, 1957), pp.35-38 (an entire chapter is devoted to extension and comprehension), pp.40-52 (the predicables); Andrew H. BACHHUBER, *op. cit.*, pp.17-22 (comprehension, extension, and their inverse relationship), pp.242-53 (the predicables).

2. W. Stanley JONES, *Studies In Deductive Logic* (Fourth Edition; Macmillan and Co., 1908), p.126.

3. Cf. Régis JOLIVET, *Traité de Philosophie* (2<sup>e</sup> édition; Lyon: Emmanuel Vitte, Éditeur, 1945), Vol. I, p.60.

4. Cf. Andrew H. BACHHUBER, *op. cit.*, p.17.



expression means that if a small error is made in the beginning, it will grow to huge proportions in the end. Such a phenomenon was amply manifested in the historical part of this study where it was seen how the moderns rejected the fixity of meaning imposed on extension and comprehension by the ancients, and introduced not only new words but also new meanings for the old words.

Therefore, the most fitting way to teach logic seems to imply beginnings with a study of the predicables. Once those active modes of predication have been mastered, the student will be better prepared to understand correctly the doctrine of extension and comprehension in logic. Furthermore, when logic is taught it must not be forgotten that these two words, namely, 'extension' and 'comprehension,' should be understood analogically with reference to quantity. In fact all relations of reason are named analogically from quantity.

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