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FORMAL ASPECTS OF REDUPLICATION

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1. Aristotle

Aristotle's presentation of ontology advanced at the beginning of the fourth book of *Metaphysics* is universally known: "there is a science which studies being *qua* being…". Needless to say, this is a familiar sentence: unfortunately, it is also quite an odd one. Why Aristotle does not simply say that ontology is the theory of being? Is there any difference between 'theory of being' and 'theory of being *qua* being'?

In brief, the problem is to decide whether the two expressions 'the study of being' and 'the study of being *qua* being' are equivalent. If they are, the '*qua*' does not play any interesting role. On the contrary, if the two expressions are different, that is to say, if there is a difference between the study of being (*simpliciter*) and the study of being *qua* being, we should study the role played by the (operator) '*qua*'.

Let us remember that '*qua*' is a technical term. The word is the Latin translation of the Greek '*he*' in the expression '*on he on*' which, in the 17th century, gave origin to the term 'ontology'.

I shall call 'reduplicative' the expressions containing some instance of the functor '*qua*'. Theories of reduplicative expressions will also be labelled as *qua*-theories.[1]

Aristotle was apparently the first to make systematic use of reduplication.[2] Despite this systematic use, however, it is odd how infrequently the theme of reduplication has been examined by Aristotle's commentators. This peculiar situation stems in large part from the view that '*qua*' in Aristotle was merely an expressive device which he used to indicate what is today called ontology. In other words, under this interpretation the expression 'being *qua* being' simply indicates the fact that it is ontology which is being talked about, and that therefore no functional value should be assigned to the particle '*qua*'.

Since the present study is not philological in its scope, I shall not try to map these various interpretations. Nor shall I examine the polemics they have provoked. I shall instead do no more than set out some elements which I personally believe warrant explicit consideration.[3]

[1] The term 'reduplication' (*anadiplosis*) is to be found in Aristotle. For a general presentation of reduplication see Poli 1995a.

[2] Mates 1986, 32, claims that Plato made important use of *qua*, which he usually rendered as 'in virtue of' (to which corresponds the pronoun ϖ).

[3] I must acknowledge my debt to Leszl 1975, although his interpretation is not always

My thesis is that Aristotle did clearly distinguish between theory of being and theory of being *qua* being. In contemporary terms, we can translate such a distinction into the difference between ontic (theory of being) and ontology (theory of being *qua* being).

Before continuing, I would like to note that two of the chapters indispensable to thorough understanding of the role of the functor *qua* are *Metaphysics* XIII and XIV. In these chapters Aristotle addresses the problem of mathematics, its objects and the manner in which it is studied.[4] Having no time to develop this point, I immediately close this digression.

The main reason for distinguishing between theory of being and theory of being *qua* being concerns Aristotle's opinion that the analysis of being *simpliciter* cannot be developed in a scientific fashion. The intention to submit being to scientific analysis is the main reason why Aristotle was forced to adopt a reduplicative kind of analysis.[5] His position derives from the thesis that being is not a genus.[6]

coherent with mine, namely that *qua* is better understood as a functor.

[4] For wide-ranging and innovative treatment see Annas 1976 and 1986. The central point of XIII 3 is the statement to the effect that mathematics studies what is sensible — not *qua* sensible, however, but *qua* surface, line, etc. (1077b22). Let us recall some other passages: "the arithmetician assumes man to be one indivisible thing, and then considers whether there is any attribute of man *qua* indivisible. And the geometrician considers man neither *qua* man nor *qua* indivisible, but *qua* something solid" (1078a23). To which one may add, returning to IV: "For just as number *qua* number has its peculiar modifications, e.g. oddness and evenness, commensurability and equality, excess and defect, and these things are inherent in numbers both considered independently and in relation to other numbers; and as similarly other peculiar modifications are inherent in the solid and the immovable and the moving and the weightiness and that which has weight; so being *qua* being has certain peculiar modifications, and it is about these that it is the philosopher's function to discover the truth" (1004b10). Reduplication is discussed in many other passages. In *Prior Analytics*, for example, Aristotle analyses its application to syllogisms: cf. *Prior Analytics* I, 38, 49a11–49b3. I shall not consider these further specifications here, since the material collected is already sufficient for an interpretation of the Aristotelian theory of reduplication.

[5] The sole assumption that the expressions 'being *sempliciter*' and 'being *qua* being' are different in meaning runs explicitly counter to the interpretative tradition of Owens and Merlan, for whom *kath auto* or *per se* should be construed as *simpliciter* or 'as such'. A persuasive reason for rejecting their interpretation is the consequences arising from analysis of geometric entities, which become ideal entities. As Leszl 1975, 155 notes, "This is no doubt how it should be conceived, if the line were supposed to be given as something ideal instead of being idealized by means of an intellectual process... It would be peculiar to find a return to Platonism in the use of precisely those conceptual instruments, such as the qualification '*qua* X', which Aristotle uses in order to avoid any form of Platonism, e.g. to fight against the theory of forms".

[6] The thesis is not controversial and is explicitly asserted in various passages, for ex-

It is well known that, for Aristotle, scientific analysis can be developed only if there is a common genus for the entities under examination. If being does not have a common genus, the study of being cannot be a science.

From this arises a fundamental difference between the study of being and the study of being *qua* being. If ontology is a science, we must admit that there is a common genus for the entities studied by ontology. The principal difference between the study of being and of being *qua* being therefore consists in the fact that being lacks of a common genus, while being *qua* being possesses its own common genus. There thus appears one of the functions performed by the functor *qua*: that of assigning a common genus to whatever in itself does not possess it.[7]

2. Some general features of reduplication

Consider now the following cases: (i) 'Jones is sweeping the leaves', (ii) 'Jones, *qua* roadsweeper, is sweeping the leaves', (iii) 'Jones, *qua* Jones, is sweeping the leaves'. Let us try to interpret these three cases, even if only *prima facie*.

The first sentence is true or false according to the existence of a corresponding state of affairs in the world, and it does not seem to raise particular problems (apart from those which usually accompany the theories of truth and reference).

The second case differs from the first because it contains the *justification* of the content expressed. For this proposition to be true *two* different conditions must be fulfilled: first, the relevant state of affairs must exist (that is, there must be a bearer of the proposition's truth, as in (i)), second, one must verify whether the action described is one of the tasks that the subject is duty-bound to perform. The two conditions are *independent* of each other: the proposition may be false because, for example, there is no one who is sweeping the leaves (condition (i)), or because although Jones is sweeping the leaves he is not doing it in his quality as roadsweeper (condition (ii)).

Very different is (iii), the case of reflexive reduplication. The linguistic form of this reduplication is typically 'Jones, *qua* Jones, is . . . '. While in the two above cases the truth conditions were respectively due to the existence of an external bearer (case (i)) and to the twofold presence of an external bearer

ample *Metaphysics* III, 3, 998b14ff (to which should be connected *Topics* VI, 6, 144a36ff); *Metaphysics* I, 2, 1953b22–23, *An. Post*. II, 7, 92b13. See Leszl 1975, 72.

[7] For a detailed analysis of Aristotle's theory of reduplication, see Poli 1995b.

and of a relevant 'aspect' (case (ii)), in the third case the truth conditions are also tied to *internal* conditions. The conditions necessary for one to be able to say that 'A, *qua* A, is B' is that B is (intensionally) included in A, or that being A entails being B. An interesting variation is to move from the hypothesis that B is *explicitly* contained in A to the hypothesis that B is obtainable from the notes present in A (for example by conjunction, or by means of some other more complex operation). This latter point involves the problem of complex properties (negatives, disjunctives, etc.).

3. Reduplicative expressions

As I have already said, I shall call a theory of the functor '*qua*' a '*qua*-theory'. This functor is used in expressions like 'A *qua* B is C'. Some synonymous expressions are 'as', 'in so far as', 'in virtue of', 'with respect to'.

In Poli 1995a I summed up the general features of reduplication in the following terms:

> the functor *qua* (i) makes manifest the relationship between the object in itself, its ontological frameworks and a certain mode of looking at the object, or (ii) functions as an indicator of the context (semantic field or level of description) in which the object is being considered. ... In both cases, the conditions must be found which justify the passage from an analysis of the object *sempliciter* to a reduplicative analysis. In general terms: the passage from an ontic consideration to an ontological one. When the second level is reached, the formal criteria emerge which can be used to distinguish among the various cases of reduplication. The most important of these criteria is that between the reflexive and locative forms of reduplication. In the former case, the structure of the reduplication takes the form 'A *qua* A is...'; in the latter it takes the form 'A *qua* B is...'. I shall call the latter form of reduplication 'locative' because it indicates — *localizes*, precisely — the context of description.

We can classify reduplications adopting a part-whole perspective. In so doing we shall distinguish the (i) reduplication of the whole through itself, from the (ii) reduplication of the whole through (some of) its parts. This latter reduplication can further be distinguished into (ii–j) reduplication through material (detachable) parts and (ii–jj) reduplication through conceptual (distinguishable) parts.[8]

[8] 'Moments' in Husserl's terminology.

According to the standard Aristotelian analysis developed at the end of the 12th century, there are two principal types of *qua*-proposition: reduplicative in the strict sense ('locative' in my terminology) and specificative ('reductive' in my terminology).

Aristotle's examples are

Every man *qua* rational is risible	locative
The Ethiopian is white with respect to his teeth	reductive

In the Middle Ages reductive propositions were studied in terms of part and whole. The quoted Aristotelian expression was justified by the fact that the teeth are an integral (material) part of a man. In this case, 'in respect to' changes its reference from the body as a whole to a specific part of it. One thus understands why this reduplication became known as reductive.

These reduplications do not admit to simplification, i.e. the inference from 'A *qua* B is C' to 'A is C'.

Note that the meaningfulness condition of this reduplication is that the whole should be endowed with structure.

Summing up:

(i)	Reflexive reduplication:	A *qua* A is C
(ii–j)	Reductive reduplication:	A *qua* B is C
(ii–jj)	Locative reduplication:	A *qua* B is C

Reductive and locative reduplications use different terms to the left and the right of *qua*. They are distinguished by whether they admit to simplification or whether they do not, i.e. by whether we can infer 'A is C' from 'A *qua* B is C'. Locative reduplication admits to this *simplification*, but a reductive one does not.

In what follows we shall consider only reflexive and locative reduplications.

4. Formal analysis of reduplication

The expression 'A *qua* B is C' is a double judgement which can be decomposed into two different expressions: (i) A is B, and (ii) Every B is C (many mediaevals added 'and being B entails being C').

In more general terms, we may say that formal analysis decomposes the reduplicative expression into:

(i) A is B.

(ii) Every B is C.

(iii) B is the reason why the A is C.[9]

Some remarks are in order. First, the copulas in (i) and (ii) do not perform the same role. In (ii), the copula occurs in a universally quantified expression. In this case it declares the presence of a law-like connection between B and C. The case of (i) is more difficult to handle because we do not know what sort of relation holds between A and B. (iii) is formulated in terms which do not seem amenable to formal treatment. Leaving aside (iii), we can say that, under assumption (ii), the type of relation that holds between A and C depends on the type of relation that holds between A and B.

In what follows I shall examine only those forms of reduplication which admit to simplification, i.e. the inference from 'A *qua* B is C' to 'A is C'.

We may construe the *qua* as a form of connection between A and B. Let us introduce the following expressive convention: In the expression 'A *qua* B is C', the component 'A *qua* B' will be called the reduplicated object, 'A' the matter or basis of the reduplicated object, and 'B' the form or appearance (gloss).[10]

Broadly speaking, the reduplication operator behaves like an operator for terms which bind variables (like the operator of description ι or the operator of abstraction $\{\ |\ \}$.

Let us assume that the connection between matter and form of the reduplicated object entails a copulative-type link. That is to say, whatever the meaning of '*qua*', we may assume that:

(1) $\text{A } qua \text{ B} \rightarrow \text{A is B}.$

As stated above with reference to the object 'A *qua* B', 'A' is its matter and 'B' is its form. With reference to the proposition 'A is B' we may say instead that 'A' is in the material position and 'B' is in the formal position. Note the peculiar *metabasis* between objects and propositions which comes about in (1): 'A *qua* B' is clearly an object, while 'A is B' is equally clearly a proposition. It might, in fact, be better to write 'AB' instead of 'A is B', thereby expressing the connection between 'A' and 'B' as simple apposition,

[9] Maritain 1937. His formulation of (ii) is 'All B's are C's'. Note that in (iii) 'reason' could also be 'cause' or 'instrumental condition'. Cf. Barth 1974, 136.

[10] Fine 1982, 100.

without making specific indication of whatever functions as the element linking A and B.

That the more general inquiries of ontology must rely on the presence of a structure in some way intermediate between the propositional and predicative dimensions has been explicitly acknowledged by Perzanowski, who in a recent essay writes:[11]

> To express the most basic ontological notions we need quantifiers and abstract operators. We need therefore a suitable version of the classical quantifier logic.
>
> But not a predicate one. The differentiation between names and predicates, individuals and complexes, etc. which is usual for predicate calculi is clearly not ontologically innocent. Predicate languages are *too* connected with language and thought ontologies (in particular with the common ontologies of things and properties) to be accepted as the starting point for *general* ontology…
>
> Hence in general ontology and in being-ontology we shall employ languages with only *one* basic category of expression. These ontologies are thus analogous in their linguistic machinery to calculi of names, to propositional logic and to algebraic logic.
>
> Because we need quantifiers and abstraction operators we shall work within a version of classical propositional logic with quantifiers and abstractors, similar to the protothetics of Leśniewski.

I shall accept his suggestion, with only a few reservations: in conducting general ontology I do not see any reason for accepting only Leśniewski's protothetics. I would suggest that we should also consider his ontology, for the very simple reason that it does not start — as Frege does — by introducing two different semantic categories (names for objects and names for predicates), but uses only one semantic category. In this sense, the difference between protothetics and ontology concerns only the different *operations* that we perform with their elements.

Let us now pass to examine some aspects of reduplication.

There are four canonical situations, that is the interchangeability of:
(a) matter and form;
(b) single matter with several forms;
(c) single form with several matters;
(d) multiple forms and matters.

[11] Perzanowski 1995.

5. Reduplication and identity

As said, we start from the assumption:

(1) $\quad$ A *qua* B $\rightarrow$ A is B.

In Leśniewski's ontology we may define two different identity connectives. The most obvious case is that of nominal identity:

(2) $\quad$ $A = B \leftrightarrow$ A is B $\wedge$ B is A.

Hence it follows that where matter and form are invertible, we may have:

(3) $\quad$ A *qua* B $\rightarrow$ $A = B$.

More interesting is the case of extensional identity:

(4) $\quad$ $A \doteq B \;\leftrightarrow\; \forall C\,(C \text{ is } A \;\leftrightarrow\; C \text{ is } B)$.

This definition states that two forms are identical when they are the form of the same matter. That is, when for every matter C, the reduplicated objects C *qua* A and C *qua* B are interchangeable, we may derive the identity of the forms A and B:

(5) $\quad$ $\forall C\,(C \textit{ qua } A \leftrightarrow C \textit{ qua } B) \;\rightarrow\; A \doteq B$.

A third variety of identity is the identity of indiscernibles proposed by Leibniz:

(6) $\quad$ $A \equiv B \leftrightarrow \;\forall C\,(A \text{ is } C \;\leftrightarrow\; B \text{ is } C)$.

In this case the expression states that the identity of firms entails the identity of their matters. By relaxing Leibniz's thesis, we may introduce a further definition, which I shall call of sameness:

(7) $\quad$ $A \approx B \;\leftrightarrow\; \exists C\,(A \text{ is } C \leftrightarrow B \text{ is } C)$

on the basis of which one asserts that A and B are 'in some sense' identical.[12]

The use of a Leśniewskian framework is interesting because it enables us to see the complementarity between definitions (4) and (6).

In systematic terms, we may state that the expression 'A *qua* B' can be understood in both the ontological and the epistemological sense. In the ontological sense, we have Leśniewski's interpretations of the identity of

[12] I owe this suggestion to Vladimir Vasyukov.

matter and form (2) or of the dependence of forms on matters (3: two forms are equal when they are the forms of the same matter). In the epistemological sense we have Leibniz's view that matters depend on forms. This latter assertion comes in a strong version (6: two matters are equal when they are matters of the same forms) and a weak version (7: two matters are (in some sense) equal when they are the matters of at least some forms).

(7) is a weaker version of (6), which is complementary to (4). On this basis we may try to weaken (4) according to the same relationship as holds between (7) and (6). We thus obtain:

(8) $\quad \mathrm{A} \approxeq \mathrm{B} \leftrightarrow \exists\, \mathrm{C}\, (\mathrm{C \text{ is } A} \leftrightarrow \mathrm{C \text{ is } B}).$

Note, however, that the cases considered so far are somewhat atypical because they cancel out the asymmetry between matter and form. Although the relationship between *qua* and identity enables one to delineate a broad spectrum of concepts of identity (and of sameness), it is somewhat peculiar and ultimately deceptive. For adequate understanding of the reduplication functor we must examine contexts in which the asymmetry between matter and form is not annulled. However, before turning to these situations, I shall conclude analysis of conditions of identity by examining the case of the identity between *qua*-objects.

6. Identity between *qua*-objects

A further interesting complication arises in the case of identity between two *qua*-objects. When can we say that 'A *qua* B' and 'C *qua* D' are the same object?

The general form of this definition is:

(9) $\quad \mathrm{A}\ \mathit{qua}\ \mathrm{B} \Bumpeq \mathrm{C}\ \mathit{qua}\ \mathrm{D} \quad \text{iff} \quad \mathrm{A} \Bumpeq \mathrm{C} \text{ and } \mathrm{C} \Bumpeq \mathrm{D},$

where $\Bumpeq$ can be $=$, $\doteq$, $\equiv$, $\approx$ or $\approxeq$.

The first feature to note is that the objects A *qua* B and C *qua* D can be called identical in each of the five senses listed above. In effect, the most interesting cases seem to be those in which $\Bumpeq$ is $=$, $\doteq$ or $\equiv$.

Secondly, it is possible to have different identity conditions for matters and for forms. One may consequently assert that a 'substantialist' or 'materialist' option is characterized by the requirement that the identity conditions for matters *should not be weaker* than the conditions for the identity of forms. A 'functionalist' strategy, by contrast, requires that the conditions of identity of forms should not be weaker than those for matters.

Combination of these various possibilities yields the following situations:

(10) A *qua* B = C *qua* D iff A = C and C = D.

(11) A *qua* B $\doteq$ C *qua* D iff A = C and C [?] D,

(12) A *qua* B $\doteq$ C *qua* D iff A $\doteq$ C and C [?] D,

where the identity conditions for forms are unimportant. What matters are the identity conditions for matters. Hence we may write:

(13) A *qua* B $\doteq$ C *qua* D iff A = C,

(14) A *qua* B $\doteq$ C *qua* D iff A $\doteq$ C.

The next cases are complementary to (11) and (12).

(15) A *qua* B $\equiv$ C *qua* D iff A [?] C and C = D,

(16) A *qua* B $\equiv$ C *qua* D iff A [?] C and C $\equiv$ D.

In this situation, the essential conditions are those which concern forms, while the conditions applying to matters are irrelevant. Hence, we need only write:

(17) A *qua* B $\equiv$ C *qua* D iff C = D,

(18) A *qua* B $\equiv$ C *qua* D iff C $\equiv$ D.

7. Other formal properties of *qua*

We may now list some other formal properties of the *qua* functor. With reference to the expression 'A *qua* B is C' we may say that 'A' is the first, 'B' is the second and 'C' is the third.

Transitivity of the second (TRii)

$$\frac{\begin{array}{c}\text{A } \textit{qua} \text{ B is C}\\ \text{B } \textit{qua} \text{ D is E}\end{array}}{\text{A } \textit{qua} \text{ D is E}}$$

holds in cases in which *qua* subsumes the senses =, $\doteq$, $\equiv$.

Transitivity of the third (TRiii):

$$\frac{\begin{array}{c}\text{A } \textit{qua} \text{ B is C}\\ \text{C } \textit{qua} \text{ D is E}\end{array}}{\text{A } \textit{qua} \text{ D is E}}$$

As above, this holds in cases in which *qua* subsumes the senses $=$, $\doteq$, $\equiv$.

Symmetry (SI):

$$\frac{\text{A } \textit{qua} \text{ B is C}}{\text{B } \textit{qua} \text{ A is C}}$$

Holds in all the cases listed: $=$, $\doteq$, $\equiv$, $\approx$ and $\approxeq$.

Leftwards reflexivity (LR):

$$\frac{\text{A } \textit{qua} \text{ B is C}}{\text{A } \textit{qua} \text{ A is C}}$$

In set terms we may say that this holds on condition that $\mathrm{A} \subseteq \mathrm{B}$ or $\mathrm{A} \in \mathrm{B}$; it does not hold if $\mathrm{A} \cap \mathrm{B} = \emptyset$ or if $\mathrm{A} \notin \mathrm{B}$.

It is worth noting that in these cases it is not necessary to distinguish between membership and inclusion (distinguishing them, in fact, would entail doubling the conditions). This point is important because it shows that the *qua* is a function proper to traditional logic. And it also evidences at least one of the reasons why contemporary logic has consigned reduplication to oblivion.[13]

Rightward reflexivity (RR)

$$\frac{\text{A } \textit{qua} \text{ B is C}}{\text{B } \textit{qua} \text{ B is C}}$$

always holds.

8. Mereological aspects of reduplication

As well as working on the assumptions tied to the connection B–C, one can also act directly on A, for example by proceeding from A to its parts or from A to the wholes of which it is a part. We therefore have:

[13] The only 'modern' logician to have developed a theory of reduplication is Bolzano. Angelelli 1967, 96 notes that "the interesting phenomenon of *reduplicatio* seems to have been forgotten in contemporary philosophy; perhaps Bolzano was the first and the last modern logician having paid attention to it, and in a very interesting way indeed".

(19) A *qua* B is C $\rightarrow$ $(\forall \mathrm{D}\,(\mathrm{D} < \mathrm{A}))$(D *qua* B is C).

If all A *qua* B is C then each part D of A *qua* B is C. This assertion holds for mereological wholes but not for Gestalt ones.[14]

(20) A *qua* B is C $\rightarrow$ $(\exists \mathrm{D}\,(\mathrm{A} < \mathrm{D}))$(D *qua* B is C).

If A *qua* B is C then for some D which contains A as its part, D *qua* B is C.

The adoption of these procedures, when valid, allows certain obvious ordering procedures to be introduced.

9. Internalization mechanisms

Reduplication has also been called the 'functor of internalization'.[15] The formal reason for this derives from the fact that complex reduplicative expressions enable a form of connection to be established between propositional connectives and nominal connectives. (This also justifies my decision to use a framework which combines both Leśniewski's protothetics and his ontology). The connection is particularly evident in the following two cases:

propositional connectives	$\wedge$	$\vee$
nominal connectives	$\cap$	$\cup$

(A) Variation of the first

(21) A *qua* B is C $\wedge$ D *qua* B is C $\leftrightarrow$ $(\mathrm{A} \cap \mathrm{D})$ *qua* B is C,

(22) A *qua* B is C $\vee$ D *qua* B is C $\leftrightarrow$ $(\mathrm{A} \cup \mathrm{D})$ *qua* B is C.

(B) Variation of the second

(23) A *qua* B is C $\wedge$ A *qua* D is C $\leftrightarrow$ A *qua* $(\mathrm{B} \cap \mathrm{D})$ is C,

(24) A *qua* B is C $\vee$ A *qua* D is C $\leftrightarrow$ A *qua* $(\mathrm{B} \cup \mathrm{D})$ is C.

The same result can be obtained by introducing two new functors, increasing and decreasing:
M(A,B) = selects the larger between A and B (larger as broader)

m(A,B) = selects the smaller between A and B

[14] As regards the difference between mereological and Gestalt wholes, for the latter the principles of order between the parts and transposition hold; principles which cannot be applied to mereological wholes.

[15] See Fine 1982.

(25) A *qua* B is C $\wedge$ A *qua* D is C $\leftrightarrow$ A *qua* m(B, D) is C,

(26) A *qua* B is C $\vee$ A *qua* D is C $\leftrightarrow$ A *qua* M(B, D) is C.

This works if the seconds are organized into some type of order.

(C) Variation of the third

(27) A *qua* B is C $\wedge$ A *qua* B is D $\leftrightarrow$ A *qua* B is $(C \cap D)$,

(28) A *qua* B is C $\vee$ A *qua* B is D $\leftrightarrow$ A *qua* B is $(C \cup D)$.

The above characterizations are restricted to conjunction and disjunction. Their principal limitation is the lack of an obvious interpretation of negation and in consequence the lack of an obvious interpretation of implication. In this case we pay the penalty for one of the major differences between modern formal logic and traditional logic. One of the principal features of traditional logic, in fact, is the distinction between nominal negation and propositional negation. Its absence from the framework of standard logic stems from the difficulties that arise in handling 'in modern manner' the concepts of traditional philosophy. Leśniewski's framework enables both negations to be defined, albeit with the constraint that nominal negation is restricted to the terms that occur in the formal position.[16]

10. Existence conditions

We may distinguish among several senses of existence. Consider the following two cases:

(29) The *qua*-object 'A *qua* B' exists at a certain time (world-time) iff A exists and has B at a given time (world-time).

(30) The *qua*-object A *qua* A always exists.

In the first case the existence of the object 'A *qua* B' depends on the existence of A. In the second case the reduplicated object always exists. This difference between locative reduplication and reflexive reduplication is of especial importance because it highlights the profoundly diverse nature of the two reduplications. If the above distinction is correct, it follows that reflexive reduplication is in effect a purely conceptual operation which only addresses the realm of essences. Locative reduplication, in contrast, seems

[16] Leśniewski's definition is: A is $\sim$B $=$ A is A and $\neg$(A is B).

to involve forms of reasoning tied to explicit statements about reality. The difference between the two cases alters if, while preserving our reference to the Leśniewskian framework, we interpret (29) as follows:

(31) $\quad \mathrm{A}\ \mathit{qua}\ \mathrm{B} \ \rightarrow\ \mathrm{A}\ \text{is}\ \mathrm{A}\ \wedge \mathrm{A}\ \text{is}\ \mathrm{B}.$

In this case, for every *qua*-object leftward reflexivity (LR) holds, and therefore for every term in the subject position the corresponding reflexive reduplication applies. The shortcoming of this approach is that it precludes analysis of contradictory objects. A paraconsistent extension of Leśniewski's ontology might enable us to overcome this obstacle.

References

Angelelli 1967 I. Angelelli, "On identity and interchangeability in Leibniz and Frege", Notre Dame Journal of Symbolic Logic, 94–100.

Annas 1976 J. E. Annas, *Aristotle's Metaphysics, Books M and N*, translated with introduction and notes, Oxford, Oxford University Press.

Annas 1986 J. E. Annas, "Die Gegenstände der Mathematik bei Aristoteles", in Gräser 1986, 131–147.

Fine 1982 K. Fine, "Acts, events, and things", in Leinfellner Krämer Schank 1982, 97–105.

Gräser 1986 A. Gräser (ed.), *Mathematics and Metaphysics in Aristotle. Mathematik und Metaphysik bei Aristoteles*, Bern-Stuttgart.

Knuuttila Hintikka 1986 S. Knuuttila and J. Hintikka (eds.), *The logic of being*, Dordrecht·Boston·Lankaster·Tokyo, Reidel.

Leinfellner Krämer Schank 1982 W. Leinfellner, E. Krämer and J. Schank (eds.), *Language and ontology*, Wien, Hlder·Pichler·Tempsky.

Leszl 1975 W. Leszl, *Aristotle's conception of ontology*, Antenore, Padova.

Maritain 1937 J. Maritain, *An introduction to logic*, London.

Mates 1986 B. Mates, "Identity and predication in Plato", in Knuuttila Hintikka 1986, 29–47.

Perzanowski 1995 J. Perzanowski, "The way of truth", in Poli Simons 1995.

Poli 1995a R. Poli, "*Qua*-theories", unpublished.

Poli 1995b R. Poli, "A first sight to Aristotle's theory of reduplication", in preparation.

Poli Simons 1995 R. Poli, P. Simons (eds.), *Formal ontology*, Dordrecht, Kluwer, 1995.

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