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CHATEAUBRIAND ON THE NATURE OF LOGIC

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Abstract: In this paper Chateaubriand's approach to solve some problems related to the nature of logic is confronted with the traditional approaches. It is shown that his hierarchy of logical types opens up new possibilities to characterize logical properties and logical truths and that it also sheds some new light on the foundations of mathematics.

Key-words: Foundations of logic. Foundations of mathematics. Hierarchy of logical types. Chateaubriand. Frege. Tarski.

The order in which a system is exhibited almost always does not correspond to the order in which it has been elaborated. The system proposed by Oswaldo Chateaubriand is no exception (see Chateaubriand 2001). Since it contains many original ideas and original interpretations of traditional ideas which were initially developed to refute the slingshot-argument, especially the variant formulated by Gödel, the first chapter of the book with regard to the order of elaboration is the fourth chapter with regard to the order of exhibition. The diverse parts of the system form an organic whole making it difficult to apprehend them in isolation; this explains also the recurrence of some ideas.

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Among the many philosophical questions which Chateaubriand's work tries to answer there is one I am especially interested in: What is logic? This question can be answered in different ways corresponding to the possible senses the question might be given. In what follows, I shall identify these and examine Chateaubriand's answers to the corresponding questions.

A) MINIMAL CHARACTERIZATION OF LOGIC

I use the expression "minimal" to refer to those characterizations in which characteristic marks are enumerated that are sufficient to distinguish what is so characterized from the rest; to put in Leibniz' jargon, a minimal characterization of something is a nominal definition of that thing.

In some passages Chateaubriand alludes to a traditional characterization of logic according to which logic is "universal in some sense" (Chateaubriand 2001, p. 26, p. 302). This characterization, which goes back at least to Kant, contains a positive thesis about logic. But, according to Kant (KrV, B3-4), (strict) universality is only one of those criteria by means of which one recognizes a pure *a priori* knowledge; consequently, if we respect Kant's verdict we have to admit that it is insufficient to provide a minimal characterization of logic. Kant has also a negative thesis about logic according to which (general and pure) logic abstracts not only from particular contents, as the rationalists claimed, but also from all other content (KrV, B78), because it neither enlarges nor amplifies our knowledge (KrV, B86) and, consequently, concerns only the form of thought in general (KrV, B79). With regard to this negative thesis, Chateaubriand agrees with the common view that logic does not have, in a certain respect, ontological commitments, namely insofar as it does not imply the existence of non-logical entities, but he admits, in accordance with his realist conception, that logic treats of "specifically logical entities" (Chateaubriand 2001, p. 26). However, what

Chateaubriand considers here as “specifically logical entities” appears to correspond, in Kant’s terminology, more to the form of judgements than to their contents.

According to another common characterization of logic, which is presumably a minimal one, logic is concerned with inferential patterns (schemes, forms) all of whose instances are correct. MacFarlane (2000, pp. 36-41) calls this the conception of schematic formality. Since, in the introduction of his book, Chateaubriand criticizes the grammatical conception of logic formulated by Quine which is closely connected with the conception of schematic formality, it appears that Chateaubriand does not accept this characterization of logic, too.

The following two answers to the question “What is logic?” to be discussed presuppose some general knowledge of the structuring of reality by the hierarchy of logical types that is proposed by Chateaubriand in Chapter 9 (2001, pp. 297-339). He divides all entities into three categories: properties, objects and states of affairs. The differences between these categories are partly explained by referring back to Frege’s well-known metaphor that properties are insaturated (or incomplete) entities whereas objects and states of affairs are saturated (or complete) ones. On the other hand, properties and states of affairs are to be found at all levels of the hierarchy except level 0, whereas objects are to be found only at level 0. Properties correspond to Fregean functions, whereas objects correspond to Fregean objects. States of affairs, which are also called “objects of superior level”, are a novelty with regard to the Fregean ontology. They are introduced, basically, because of the needs of the theory of truth proposed by Chateaubriand – the theory of “truth as identification” – according to which a sentence is true if and only if the state of affairs to which the sentence refers actually exists.

The hierarchy proposed by Chateaubriand is distinguished from more traditional hierarchies such as the hierarchy tacitly employed by Frege and the hierarchy explicitly employed by Russell mainly by two

features: the flexibility of degrees of properties and the accumulation of properties in the hierarchy. The flexibility of degrees of properties permits, among other envisaged theoretical ends, to represent, by means of the multi-degree property of Diversity, sets and extensions of properties in terms of states of affairs, and with that to do without them (Chateaubriand 2001, p. 311). As will be shown in more detail below, the accumulation of properties in the hierarchy serves to characterize logical properties, but it is introduced, it seems to me, to do justice to natural language. Thus, when we are speaking of the property of existence in a general way, we are not referring to one of the specific properties of existence at a given level, but are referring to the limit of the properties of existence that are to be found in the hierarchy.

The following notation appears to be adequate for describing the logical type of an entity:

The logical type τ of an object is 0.

The logical type τ of a property of level λ and arity κ is:

$$\langle \langle \lambda, \kappa \rangle_{C(\kappa), \tau_0, \tau_1, \dots} \rangle_{C'(\{\langle \lambda_i, \kappa_i \rangle\})}$$

In the case that $C(\kappa)$ is omitted, the property has the fixed arity κ , that is, it is a mono-degree property. The presence of $C(\kappa)$, where κ is the parameter, indicates the conditions under which the arity of the property can vary its degree. In the case that $C'(\{\langle \lambda_i, \kappa_i \rangle\})$ is omitted, the arguments of the property have a fixed type, that is, the property is non-cumulative. The presence of $C'(\{\langle \lambda_i, \kappa_i \rangle\})$, where the level and the arity of the arguments are parameters, indicates the conditions under which a property is cumulative in the hierarchy. τ_0, τ_1, \dots are logical types of the property's arguments.

· The logical type τ of a state of affairs of level λ is:

$$\langle \langle \langle \langle \lambda, \kappa \rangle_{C(\kappa)}, \tau_0, \tau_1, \dots \rangle_{C(\{\langle \lambda, \kappa \rangle\}_{i \in \kappa})}, \tau_0, \tau_1, \dots \rangle, \tau_0, \tau_1, \dots \rangle,$$

because a state of affairs of level λ is nothing more but the saturation of a property that is also of level λ .

B) CHARACTERIZATION IN TERMS OF LOGICAL PROPERTIES

Since a property can accumulate in the hierarchy, it is possible that some properties occur along final segments of the hierarchy. These properties are called “logical properties” and the limits of such properties “absolute properties”. The limit of a property does not belong to the hierarchy, and it is, therefore, not a property in the strict sense. In this way Chateaubriand conceives of the universality of a property as its omnipresence from a determined hierarchical level onward. The classical text on logical properties is a posthumous article by Tarski (1986). In the spirit of the Erlanger program of Klein, Tarski proposed as a criterion for the logical status of a notion (considered as a set theoretical entity) the invariance under permutations of the power set of the universe of discourse. Surprisingly, although Tarski’s proposal differs *prima facie* very strongly from the proposal made by Chateaubriand, they are similar with respect to the obtained results. For, both Tarski and Chateaubriand draw the conclusion that relations of cardinality (universality, vacuity, non-vacuity, uniqueness, etc.) are logical notions (properties). But, they also agree that the relations of the square of oppositions (total and partial inclusion, total and partial exclusion) have the status of logical relations. These similarities deserve a more careful examination.

C) CHARACTERIZATION IN TERMS OF LOGICAL TRUTH

In his article mentioned above, Tarski confines himself to the characterization of logical notions, omitting the discussion about logical

truths. Bellotti (2003, p. 402) finds it astonishing that Tarski is able to characterize the logical notions independently of the logical truths about these notions. Chateaubriand's approach to characterize logical notions goes exactly into the opposite direction: it is guided by the conviction that the characterization of logical truths depends on the characterization of logical properties. Since a state of affairs is simply the result of saturating a property, and since a statement (proposition) is true if and only if the corresponding state of affairs is to be found in the hierarchy, a logical truth is identified with the corresponding state of affairs to be found in the hierarchy that this state of affairs is the result of saturating a logical property by other logical properties. At this point two observations are instructive.

First, although Chateaubriand makes extensive use of the metaphor of saturation, he employs it in a sense that is different from that proposed by Frege, for he allows that a property is saturated by another property and, with that, that an unsaturated entity is saturated by another unsaturated entity – this, however, is absolutely excluded by Frege. This dissonance with Frege cannot be resolved because Chateaubriand's employment of the saturated/unsaturated dichotomy is fundamental to his characterization of the logical truths. Second, in contrast to Frege, Chateaubriand recognizes statements lacking a truth-value as legitimate within the realm of logic. Thus, although Chateaubriand agrees with the common view that $\forall x (x = x)$ is a logical truth because the corresponding state of affairs (in symbols <Reflexivity, Identity>, where both Reflexivity and Identity are logical properties) is to be found in the hierarchy, he disagrees with the common view by maintaining that $a = a$ is not a logical truth because an individual constant can fail to denote something.

D) CHARACTERIZATION IN TERMS OF LOGICAL INFERENCE

Within his discussion of the fundamental platonic forms that are cited in Plato's Sophist – Being, Movement, Rest, Identity, Difference –

van Fraassen suggests that among these forms there are some non-extensional relations: “[...] in fact, every part of Difference is a part of Being, so Difference is a part of Being. Contrariwise, Being is part of Difference: whatever is, also is not in some sense. [...] So Being and Difference each are part of the other; any possible individual participates in both. The logician’s immediate impulse must be to say that they are the same, for the distinction between them thus corresponds to no conceivable distinction in fact (in the individuals). But Plato argues that they are distinct forms [...]” (van Fraassen 1969, p. 490). Although he does not present any particular example, Chateaubriand seems to adopt the same opinion, insofar as he “hold[s] that there are non-extensional relations between properties” (Chateaubriand 2001, p. 72). This view clearly presupposes the legitimacy of modal notions and modal logic. However, modal logic aroused suspicion by some distinguished contemporary logicians, for instance, by Frege, because he considered modal logic as a part of psychology, and also by Gödel, despite the fact that he used it in several occasions, e.g., in his version of the ontological argument for the existence of God and in his argument for the irrealism of time, because he was not convinced to have “any clear philosophy in the models for modal logic”. See Wang (1996, p. 82).

In order to get a more complete picture of Chateaubriand’s system, it would be interesting to know what is his opinion about modal logics and possible world semantics would be like. And, with regard to practical reasoning, it would also be of interest to know whether he admits the application of the logical relations to the realm of ought or, at least, the application of such relations that are analogous to the logical relations within the realm of being.

E) CONNECTIONS WITH OTHER PHILOSOPHICAL DISCIPLINES

A major part of the Introduction is dedicated to the question of what the connections between logic and other disciplines are. There, Chateaubriand gives a classification of the different conceptions of logic which refers to the relation between logic and other disciplines: the group of the linguistic conceptions of logic and the group of the ontological-epistemological conceptions of logic. Chateaubriand's own conception belongs to this last group.

According to him, the relation between logic and ontology is of the following kind: the fundamental notion of logic is the notion of truth and this notion refers to reality itself. The manner in which Chateaubriand formulates this point is inspired by Frege: logic is concerned with the laws of truth and these must be understood, in a certain respect, as laws of being. Another point showing the intimate relation between logic and ontology in Chateaubriand's system is the peculiar manner with which he reinterprets the central role and the organic unity that classical propositional logic and classical elementary logic have in contemporary logic: while classical propositional logic is a theory of the predicates 'is true' and 'is false', i.e., studies the laws of truth, classical elementary logic is a general theory of objects and predicates, i.e., studies the laws of being.

Just as logic is related to ontology via the notion of truth, it is related to epistemology via the notion of preservation of truth, which provides us with a precise notion of justification that is, however, probably neither necessary nor sufficient to account for the pre-theoretic notion. It is precisely because he considers the syntactic conception of proof and definition as epistemologically not significant that he rejects the linguistic conception of logic.

F) LOGIC AND MATHEMATICS

In his article mentioned above, Tarski does not take directly a position on the question: Is mathematics a part of logic? According to him, an adequate answer of this question depends on a decision of the status of the membership relation: when the universe of discourse is confined solely to individuals and the membership relation only induces a construction of classes and relations, the answer is affirmative, i.e., mathematics is a part of logic; on the other hand, when the universe of discourse contains, not only individuals, but also classes and relations, and the membership relation is a primitive notion, the answer is negative, i.e., mathematics is not a part of logic.

Chateaubriand's approach to answer this question refers to Frege's strategy: it is necessary to show that the truths of mathematics can be reduced to the truths of logic by means of appropriate definitions. However, Chateaubriand rejects one of the Achilles' heels of the Fregean project: the postulation of logical and mathematical objects. His solution seems to mix Frege's logicism with Dedekind's structuralism; according to it, mathematical truths are really logical truths, but there are no mathematical and logical objects, but only structures.

Finally, I would like to indicate the possibility of applying the instrument developed by Chateaubriand to the less well-known logicist program pursued by Gödel. In a recent article (Sautter 2003) I pointed out the main presuppositions of Gödel's project. One of them is that logic is a theory of concepts, whereas mathematics is a theory of the extensions of concepts. But, since not all concepts have a consistent extension, mathematics is only a proper part of logic. Within the part belonging exclusively to logic several self-applied concepts are to be found, as, e.g., the concept of concept. Now, the hierarchy of logical types proposed by Chateaubriand could be adjusted to the requirements of the Gödelian project in a rather simple way. There would be two possibilities: either one admits properties that have the same degree as

one or more of its arguments (the only objection made by Chateaubriand against this possibility relies on the paradoxes), or one concedes that the limits of absolute “properties” are really properties in the strict sense.

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