DIALECTICAL LOGICS AND THEIR RELATION TO PHILOSOPHICAL LOGICS

Katalin G. HAVAS

A. *From the Point of View of Philosophy of Science*

It is characteristic of some adherents of the cumulative theory of science that they regard as scientific only those ideas of past ages which fit in the frameworks of their respective paradigms and which, as a consequence, can be considered to be the predecessors of their thoughts. Thus it is not surprising that philosophers whose scope is marked by the paradigm of logical empiricism do not regard dialectical logic as logic and call in question its scientific status. However, any kind of discussion concerning the place of dialectical logic in logical research necessitates a preliminary concession to the effect that the subject matter of logic has different possibilities of interpretation.

As is well-known, the idea of dialectical logic was first expounded in a systematic way in Hengel's philosophy. But, as it is often the case with new ideas, it is possible to interpret Hegel's thoughts in different ways. Furthermore the Hegelian text itself is ambiguous with its rather sketchy analyses. This fact afforded the possibility to vulgarize some of his thoughts, detaching them from the others, and to simplify the originally profound ideas. With a bit of irony it might as well be said that nowadays there are at least as many conceptions of dialectical logic as the authors who have ever written on this subject. Needless to say, most of them claim to be Hegel's followers, no matter how different their conceptions are.

Therefore the aim of this paper is not to outline *the* meaning of the term 'dialectical logic', but to select some of the now existing meanings and to set forth some apparently reasonable thoughts that emerge from them, trying at the same time to place them within the not much less ambiguous framework of 'Philosophical Logic'.

First let me say a few words about certain conceptions which used to be widely accepted and, though they have been proved to be untenable, still seem to have a harmful after-effect. These conceptions regarded dialectical logic as the 'real' and 'true' logic. I think the basic conception underly-

ing them originated from the works of Plekhanov,([1]) but one can find it also in the book of the French philosopher H. Lefebre,([2]) or in that of Cherkesov,([3]) the Soviet logician, as well as, among Hungarian authors, in the *Logic* of Béla Fogarasi.([4])

Such a conception of dialectical logic is also the consequence of the cumulative conception of scientific progress. In this view, the development of sciences lies in the increasing growth of knowledge. Accordingly, with regard to logic, the different logical theories are subsequent stages in the progress of knowledge. Dialectical logic is supposed to be the highest stage in this process. With it, a developmental chain comes to an end, and now the task is only its internal elaboration in an increasingly refined manner; the truth has been grasped, now we have only to elaborate it in more detail.

To a certain extent, Hegel himself furnished the basis for such views. He appreciated the merits of Aristotelian logic and of the attempts made at its further development in the Middle Ages, but he writes about the science of logic of his own age as follows: "... its structure and contents have remained the same throughout a long inherited tradition, although in the course of being passed on the contents have become ever more diluted and attenuated; logic shows no traces so far of the new spirit which has arisen in the sciences no less than in the world of actuality. However, once the substantial form of the spirit has inwardly reconstituted itself, all attempts to preserve the forms of an earlier culture are utterly in vain; like withered leaves they are pushed off by the new buds already growing at their roots".([5]) Hegel calls the logic of this "new spirit" speculative logic.

He calls the logic preceding speculative logic formal logic. His relation to formal logic is characterized by three factors:

(1) A negative relation to the one-sided nature of the logic of his age. The

([1]) See for example: PLEKHANOV, G.V., *Sochineniya*, t. VIII. *Predisloviye perevodchika ko 2-omu izdaniyu broshyuri F. Engelsa "Ludwig Feuerbach"*, Moskva, 1922.

([2]) LEFEBVRE, H.: *Logique formelle, logique dialectique*, Paris, 1969.

([3]) CHERKESOV, V. I., *Logika*, Moskva, 1954.

([4]) FOGARASI, B.: *Logika*, Akadémiai Kiadó, Budapest, 1951 German translation: *Logik*, Berlin, 1956, Aufbau-Verlag.

([5]) HEGEL, G. W. F.: *Science of Logic*; New York, T. George Allen and Unwin Ltd., 1976, p. 26.

negation of the distortion of logic. The negation of the undialectical theory of the final and eternal truths in general, and particularly of that theory which claims that the results of intellectual activity should be distinguished as final truths.

(2) The preservation of all the positive results having been achieved by the science of logic up to his time.

(3) He regards formal logic as a basis, starting from, and improving upon which one can attain the knowledge of truth.

Hegel's speculative logic was no doubt a revolution in the history of logic, which was preceded by the transformation of the world of objects itself that served as the terrain of logical theories. Of course, that revolution was not without prehistory. Bacon, Descartes, Locke, Hume, Kant etc. had already objected to the simplifying currents that occurred in the science of logic, and they urged for new ways of logical research, appropriate for the new scientific demands. Hegel brought into being such a new kind of logic, in the course of examining the development of thinking as a process progressing from ignorance towards knowledge. Hegel pointed out, by means of analysing the developmen of thinking, that dialectics pertains to thinking itself as its inherent feature. Thinking is a process that progresses forward through a contradictory development: none of the results achieved in the course of thinking is final. Truth emerges in the process of recognition, in that of progressing from the lower stages of cognition towards the higher stages.

But Hegel, who earned himself a never fading reputation for elaborating the dialectical laws of the development of the thinking process, as a system-creating philosopher did not draw the necessary conclusions of his method; he thought that in his system he reached absolutely true knowledge. Through this conviction and the 'shortcomings' connected with it, he himself furnished the basis for the fact that those who lay stress on the Hegelian system oppose the so-called lower stage of logic, i.e. formal logic, to the "true' dialectical logic considered the highest stage of logic.

It is well-known that Hegel held the opinion according to which his system could afford not only the analysis of the motion of thinking, but that it was also possible to describe, by means of it, the structures of nature and society, respectively.

Some philosophers thought that, with regard to the Hegelian conception, it was only the starting-point which was mistaken; that is, that he wanted to understand reality starting out from thinking. They supposed

that, as a result of turning the relation "upside down", nature (reality) should be the starting-point, and, further, every product of thinking was to be considered as a reflected image of nature (reality).

They held that laws existed in nature independently of thinking and that their 'copies' in the mind were the laws of thinking. Objective dialectics was taken to be the dialectics of real things. The laws of dialectical logic-as they said – were the photographic images of objective dialectics.

The implications of this theory, for example, for the approach to contradictions can be summarized briefly and approximately as follows: In reality there are contradictions, therefore those logical contradictions are necessary which express real contradictions. Hence, with regard to a pair of contradictory propositions both members are true if they express some contradiction existing in reality.

Unless one recognizes the active, creative character of mind wich generates different 'true' logical systems, one has not indeed any possibility but to choose and accept either dialectical logic or formal logic as valid.

B. *Logic as ontology*

The view in which the task of logic is to disclose the structure of reality is not only characteristic of Hegelian dialectical logic. Preceding Hegel, there had existed such views even in traditional logic. What is more, there is a conception which asserts that Aristotle was the 'founding father' of not one, but at least two logics – the subject matter of one being the forms of thought and the laws of thinking, while that of the other logic was the beings in general as well as the most general relations among them.

Mathematical logic has also been accompanied by the philosophical consideration that the aim of logic is to build ontological structures. This view was given a degree of rationality by the fact that the construction of syntactical calculuses in mathematical logic caused changes in the subject mather of logic. Namely, the syntactic systems themselves are no longer about the laws and specificity of reasoning. The theses they contain usually have various possible interpretations each. Among others, in many cases, it is possible to give them an ontological interpretation.

Sometimes the view that the aim of logic (or one of its tasks) is to build ontological structures is connected with a certain definition of

'Philosophical Logic'. G. H. von Wright mentions([6]) an interpretation of philosophical logic (PhL) according to which PhL is the application of formal methods (taken from mathematical logic) to the analysis of concepts and conceptual structures in which philosophers have traditionally been interested. Therefore, since ontology belongs to the domain of philosophy, the ontologically interpreted logical systems (OILS's) belong to the field of PhL.

In OILS's, a tautology is a statement referring to all individuals. For example, the ontological interpretation of the proposition $\forall x(Fx \vee \sim Fx)$ in classical two-valued first-order predicate logic (PL) is that any individual x either has property F or has not property F. Thus the ontologically interpreted tautologies or laws in PL only differ in their degree of generality from the laws of such sciences as chemistry, physics, biology etc. They differ from them in the fact that, while the latter delineate a set of existents and only make statements about them, the laws of PL are general assertions, about *every* existent, and not only about actual existents, but also possible ones.

An OILS is an ontology of actual and possible worlds. In classical mathematical logical systems, the logical structures of the real world (the world of actual existents) and possible worlds have the same principles. In these systems, what is necessarily true in a given world w_o is true in every possible world. By now, following the development of semantics of modal logics, this principle has taken a modified form: the idea of all possible worlds has been replaced by the set of worlds which are the alternatives of world w_o, i.e. which bear a certain "alternativeness relation" or "accessibility relation" to w_o. Thus, within certain non-classical logical systems, there are possible worlds permitted whose laws are not alternative to the laws of the worlds in classical logic. Owing to this, the following questions justly arise:

Is the real world indeed the way it is described by the laws of classical logic? Are really all the worlds which are described as "deviating from the normal" (i.e. deviating from the world described by classical logic) such as do not correspond to the structure of the real world? If they are so, can they be considered as worlds at all? Can the structure of an "impossible possible world" be called an ontological structure?

([6]) See VON WRIGHT, G. H.: *Introduction* In: *Contemporary Philosophy* Vol. 1. Part two. Ed. G. Flistad, co-ed. G. H. von Wright; Den Haag, Martinus Nijhoff Publ., 1981.

In order to find proper answers to these questions it is necessary to take account of the fact that no ontology, hence no OILS, corresponds to the structure of the existing world *in itself*. Every OILS bears certain specific traces of mental reconstruction. One such specific feature is that these systems inevitably rest on certain abstractions and presuppositions about the world. (PL, for example, presupposes that the things of the world have sharply distinguishable properties etc.) Every OILS draws a picture of the world according to the abstractions and presuppositions which were accepted, consciously or unconsciously, during the construction of the system. If the presuppositions and/or the abstractions about the world are changed (like, for instance, the specificity of the alternative relation), then the class of worlds gets a different structure. In this way, according to the different structures, we obtain different 'actual worlds', each of which can be regarded at a certain level of abstraction as giving a picture of the world with certain presuppositions, but none can be regarded as free from presuppositions.

In his day, Hegel may have aspired to construct a system in which the deduction of one concept from another would yield the structure of the World, but by now we know that this is impossible. In the differently construed logical systems, if they are ontologically interpretable at all, nothing more is possible than the mental representation of certain sides, or features, of reality, at a certain level of abstraction, and with certain presuppositions about the structure of the class of worlds and hence of the real world. The 'different actual worlds' construed in different OILS's together form the mentally concrete picture of *the* World.

I think it is also the task of PhL to clarify the presuppositions and the steps of idealization used in the different OILS's. After using the formal methods, the task of PhL is to translate the results obtained into a non-formal language. Let me present a few examples of such problems of translation.

In the Frege-Russell systems it is presupposed, e.g., that the individuals have well-distinguishable properties which they retain with relative permanence, etc. If we construe a system in which we do not think of individuals according to those presuppositions, then we must be able to say what we consider to be, for example, the negation of an 'A' which is not well delineated, or unstable etc. The answer, I think, can only be that 'not-A' here has a meaning quite different from that in classical negation. By the way, whatever the meaning of the term 'not-A' is it must be used con-

sistently. I fully agree with Diderik Batens who writes: "if we give up the consistency of our metalanguage, the object level theory fails to be a theory about some domain." (p. 22)([7]) It might be added that I recognize that certain theories may be about domains or theories which are logically inconsistent, but if the object level theory is a theory about the objective dialectics (the dialectics of nature or society) then the inconsistencies described by that very theory are not logical inconsistencies. To put it differently, the meaning of 'inconsistency' in that theory is not the same when the term is used in the classical sense.

Here again we have arrived at an expression, 'inconsistency', which needs clarification because in certain systems it is used in another sense (or senses) than in classical logic.

If it is supposed that both the ontologically interpreted classical formal logicial system and dialectics attempt to give the ontology of the world in itself, then one of them must be rejected because it cannot fulfil its task. But if we conceive of each of them as being about the structure of the world, pictured according to certain abstractions and presuppositions serving cognitive goals, then this alone is enough not to find them contradictory to each other.

If we extend our interest beyond classical formal logical systems (and nowadays it seems clear that formal logic covers much broader areas), then it will become even more obvious that OILS's are not contradictory to dialectics. If dialéctical ontology is regarded as having presuppositions different from those of classical logic, then, outside classical formal-logic, it is possible to construct OILS's which correspond to certain presuppositions of dialectical ontology. However, to use a term borrowed from modal semantics, such a system constitutes the image of a world which is *inaccessible* to the world of classical logic.

C. *Logic as the analysis and criticism of thought*

There are opinions, as we find one in H. B. Curry's *Foundations of Mathematical Logic*([8]), in which PhL is the study of the norms and prin-

([7]) BATENS, D.: *Leo Apostel on Dialectical Logic*, Gent, Preprint, 1985.

([8]) CURRY, H. B., *Foundations of Mathematical Logic* McGraw-Hill Book Co., London, 1963, p. 1.

ciples of valid reasoning. Mathematical logic is distinguished from it as a part of mathematics, its aim being to construct mathematical systems for the foundations of mathematics and also systems which are used fruitfully as a means of studying philosophical logic.

In interpreting the formulas of systems of mathematical logic for the use of PhL it is first of all to be considered that the tautologies in those systems can be interpreted as sentence referring to possibilities of inferences. (Thus for example, the classical two-valued logical tautology $p \mid \sim p$ tells us that it is impossible for a pair of propositions of the form p, $\sim p$ to take the value true simultaneously. Therefore in this two-valued logic we can infer the falsity of $\sim p$ from the truth of p and vice versa.)

PhL, however, cannot merely be considered the metatheory of formal systems. Even in elaborating the theory of inference in the narrow sense, we cannot be restricted to the interpretation of the tautologies of already existing mathematical logical systems as rules of inference. Moreover, recent developments in logic precisely show that the paradoxes of already existing mathematical logical systems (for example, the formal systems containing material implication) themselves raise the necessity of constructing new theories which are closer to the intuitive concept of logical inference. The situation really is rather that formal theories often emerge following the need to make non-formal theories more precise and later, sometimes as a consequence of the greater precision of the theory, they generate a further need to produce new non-formal theories.

Furthermore, the task of PhL is not only the analysis of inferences and answering other, closely related questions. It must investigate the nature of concepts and propositions not only as regards the role they play in the inferences but also in respect of their formation and development, at least as far as they are the means of theory construction and the forms of the logical level of cognition.

If PhL is defined as the theory of the principles of correct thinking, in the above mentioned sense, then Dialectical Logic can be regarded as dealing with the specific dialectic of the logical forms of thought and, furthermore, with the dialectic of the relations between those logical forms, as well as with the dialectic of the whole process of logical cognition.

Interpreted in such a way, Dialectical Logic is not a rival theory to classical formal logic, but another part, in its own right, within the whole of PhL in the elaboration of which mathematical logic can also be used as a technical means.

In connection with the dialectic of logical forms, too, there are views which present formal and dialectical logic as if they were rival conceptions. Some authors think that, in the thinking processes, we use dialectical concepts and formal concepts separately, and we use dialectical propositions and formal propositions in the same way. Our formal concepts have definite extensions and intensions which correspond to the approach of formal logic, and our dialectical concepts are indefinite or so-called "elastic" concepts which correspond to "fringe cases". I do not believe that the opposition of formal thinking and dialectical thinking is correct here either: definiteness is a norm which we have to try to apply to every concept we use, and at the same time we have to keep it in view that every concept has its dialectical nature too. Thinking dialectically is not to refute the norm of definiteness, it is rather a requirement to count with the characteristic features of the construction and development of concepts.

The same is the case with propositions. May I take an example from D. Batens' article "Leo Apostel on Dialectical Logic", in which the dialectical principle that "any proposition produces its negation" is mentioned. D. Batens comments on it in the following way: "to render this as $\forall p\,(p \supset \sim p)$ would force us to give up either $p \supset p$, or Dilemma, or excluded middle". (p. 25)([7]) What conclusion can be drawn from this? Certainly the one that the dialectical thesis in question *cannot* be formalized with the expression $\forall p(p \supset \sim p)$ in the language of classical logic.

What can the above mentioned dialectical thesis mean?

When, in the "Grundrisse",([9]) Marx writes that through creating the concept of "production" we have separated this process from processes of consumption, distribution, or exchange, he refers to Spinoza's thesis "determinatio est negatio". Then he adds that every category established through abstraction implies the separation of the abstract moments. Applying this insight to the proposition as an abstract category the following can be said:

(A) The construing of the proposition p has produced the separation of all that is expressed in p from whatever is not p.

(B) The construing of the proposition p is only significant if with the help of p we exclude something that is not p.

([9]) MARX, K.: *Grundrisse. Introduction to the Critique of Political Economy*, New York, Vintage Books, 1973, p. 88.

These statements are general logical principles of thought which, I believe, correspond to the way in which man acts while construing a proposition.

However, the above mentioned dialectical logical thesis ("any proposition produces its negation") cannot be interpreted so that, for every p, if p is true, then it is also true that p is not true – as suggested by he formula $\forall p(p \supset \sim p)$.

As for the dialectic of the whole of the development of logical cognition, it may be in order to remark that the dialectical contradictions arising therein cannot be represented as the relation of contradiction between two propositions or, even less between two unanalyzed propositions. Dialectic does not claim that the development of knowledge may come to prove about two contradictory propositions that both are true. (In the classical logical sense of "true".) Hegel writes "truth is only realised in the form of system, ..." ([10]) On the way which leads to truth, the newly acquired knowledge, even though it transcends the old results, in most cases does not exclude the old results as unacceptable in every respect. Such a relationship between old and new results of cognition is called the dialectical negation in the development of knowledge. Classical logical negation, an operation performed on propositions turns a true proposition into a false one and vice versa. Dialectical negation does not question the validity of that rule of negation but, rather, it deals with the role both affirmations and negations play in the development of knowledge.

D. *Philosophy of logic*

Let me make a final comment on still another interpretation of PhL. Here PhL is used with the same meaning as the term 'Philosophy of Logic'. This is for example Russel's sense of PhL who regarded logic as part of mathematics, but at the same time he found it an important task, the task of PhL, to give answers to philosophical problems emerging in logic. ([11])

Now, if the expression PhL is used in the sense of Philosophy of Logic,

([10]) HEGEL, G. W. F.: *Yhe Phenomenology of Mind*, London, 1910, p. 22.

([11]) See for example RUSSELL, B.: *The Principles of Mathematics* Univ. Press, Cambridge, 1903, p. 1, and RUSSELL, B.: *My Philosophical Development*, Simon an Schuster, New York, 1959, chapters VII-VIII.

then Dialectical Logic is no *part* of this. It is *itself* the philosophy of logic, based on the dialectical approach.

The roots of this interpretation are also found in Hegel where he outlines the tasks of logic. For Hegel, all real knowledge could only be realised in the unity of both understanding and reason. Understanding is the mode of mind which makes distinctions, separations, divisions, isolations. Without this activity, concepts and propositions cannot come into being, therefore the moment of understanding is an indispensable element of cognition. The task of reason is to recognize that the understanding is not something final, that what are distinguished in different abstractions in fact belong together. But this negation, which in itself is not true either, is only the second moment of cognition. Cognition can take possession of truth only by means of the unity of understanding and reason.

Hegel regards his own logic, speculative logic, as the unity of the understanding and of the negative reason. It contains the results achieved by logic in the examination of understanding – not in a one-sided manner, but developed further, forming a unity with dialectical negations. In Hegel's words:

"In point of form Logical doctrine has three sides: (a) the Abstract side, or that of understanding; (b) the Dialectical, or that of negative reason; (c) the Speculative, or that of positive reason.

These three sides do not make three *parts* of logic, but are stages or 'moments' in every logical entity, that is, of every notion and truth whatever." ([12])

So dialectical logic taken in this sense is not one of the logical systems which correspond to the level of understanding of some age and which are isolated, without any consciousness of their unity. Nor is dialectical logic the negation of these systems. For, Hegel does not regard the "moment" of negative reason in itself as true either. Speculative logic has as its task to unite the two moments at issue in a philosophical synthesis and to form a unity from them. If we lay stress on this thought of Hegel's, then we cannot agree with the opposition of the formal logical systems and the dialectical logical systems. Instead, I would suggest that he who wants to work in this spirit of Hegel's dialectical logic should make ef-

([12]) HEGEL, G. W. F.: *Encyclopaedia of the Philosophical Sciences*, Oxford, Clarendon Press, 1975, p. 113.

forts to arrange the different logical systems into a unity, and should at last stop trying to elaborate in vain one single, "really true" system.

Hungarian Academy of Sciences Prof. Katalin G. HAVAS
Institute of Philosophy, Budapest
MTA Filozófiai Intézete
Szemere utca 10
1050 Budapest
Hongarije