Propositions and Future Contingent Statements: A Philosophical Problem

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ARTICLE DETAILS	ABSTRACT
Research Paper **Keywords :** *Propositions, Future contingent statements, Extended logic, Deviant Logic*	Logic is the science of reasoning. Reasoning is a mental process called inference, in which conclusions are drawn from premises. Propositions are accepted as the starting point of the process in an inference. Categorical propositions as a basic unit of logic, is known as classical two valued logic. But some philosophical problems arise questioning the acceptability of classical two valued logic as "the" logic. An overview on the history of logic reveals that up to a certain point of time, Aristotelian logic was considered to be the only logic. Soon logicians felt the need for the articulation of new systems of logic due to some problems faced by them which were incompatible with the classical two valued logic. As a result, we get a variety of logics.

Introduction

Logic, as a branch of philosophy aims at laying down some laws or postulates in connection with human reasoning. Logic may be defined in different ways. Charles Peirce defines logic as "…its central problem is the classification of arguments, so that all those that are bad are thrown into one division and those which are good into another…..".[1] Logic distinguishes between good and bad arguments.

It is sometimes defined as the science of reasoning. Reasoning is a mental process called inference, in which conclusions are drawn from premises. Propositions are accepted as the starting point of the process in an inference. Propositions are either true or false. The linguistic formulation of a proposition is a declarative sentence or an indicative sentence.

Logic is mainly concerned with arguments as there is a corresponding to any possible inference. An argument is defined as any group of propositions, of which one is claimed to follow from the other. Every argument has a structure which is constituted by premises and conclusion. The conclusion of an argument is that proposition which is affirmed on the basis of the other propositions of the argument. These other propositions, which are affirmed as providing grounds or reasons for accepting the conclusion, are called the premises of that argument.

The formal logic formulated by Aristotle is considered to be the foundation in the field of logical studies in general. He is the first famous logician whose works were assembled together as the *Organon* consisting of Categories, De Interpretations, Prior Analytics, Posterior Analytics, Topics and On Sophistical Refutations after his death in 322 B.C. The Aristotelian discussion on deductive logic, which is considered as traditional logic, concentrates on arguments comprised of propositions of a particular type, called 'categoric⊃al propositions'

Aristotle, while explaining the nature of a proposition, gives less importance to the matter of an argument, than its form. Thus he introduces the phrase 'that to which A' or 'that of which A' instead of simple variable like A. In formulating a proposition, he always gives importance to the predicate. He never says that "All B are A" rather he says that "A belongs to all B". According to him, categorical propositions are of four kinds. These are as follows.

1. A belongs to all B.

2. A belongs to no B.

3. A belongs to some B.

4. A does not belong to some B.

The first two forms are 'universal' whereas the last two are 'particular'. On the other hand, the first and the third form are affirmative and the second and the fourth negative. Aristotle's expression to explain categorical propositions with the phrase like "predicated of all" or "belongs to" is also called *dictum de omni et nullo*".

In his De Interpretation he distinguishes between two kinds of immediate inferences. The first kind of immediate inference is the Square of Opposition of Propositions. Two categorical propositions having the same subject and predicate terms, differing in quality, quantity or both, are said to hold the relation

of opposition of propositions. This relation between the four categorical propositions is commonly called the relation of opposition of propositions. The four kinds of opposition of propositions are contrary, contradictory, sub-contrary and sub-alternation. There are further more immediate inferences in addition to the relation mentioned above, and they are conversion, obversion, contraposition, inversion and so on.

The kind of mediate inference is called syllogism. A syllogism is a deductive argument in which a conclusion is drawn from two premises. There can be categorical, hypothetical or disjunctive syllogisms. Aristotle has laid down some rules to prove a syllogism valid or invalid.

There are some initial problems in Aristotelian logic. One such problem is that of existential import. According to Aristotle, a proposition is said to have existential import if it refers to the existence of objects of some kind. According to the interpretation of the quantifier 'some' in logic means 'at least one' and following that interpretation only particular propositions have existential import. Now, if particular propositions I and O have existential import and I follows validly from A by the rule of subalternation, according to Traditional Logic, and O from E by the same rule, then A and E must also be interpreted to have existential import. In that case, all categorical propositions, its constituent terms and their complementary terms do possess some existential commitment. If we presuppose the existential import of all propositions, then in case the subject term is empty, then all four propositions would be false at the same time. As a result, the relation of contradictory and sub-contrary in the square of opposition of proposition and some of immediate inferences do not hold good. For this reason, a new concept of presupposition has been introduced by P.F. Strawson, a great critic of formal logic.[2]The concept of presupposition holds that a class to which it refers must have members.

A relevant reference may be made to a great logician George Boole (1815-1868) who admits that only particular propositions have existential import and the universal propositions do not possess any existential commitment as they are hypothetical in nature. The Boolean interpretation rules out all kinds of opposition of propositions except contradictory. As against Aristotle, it denounces the so called some valid moods like BRAMANTIP, DARAPTI, FESAPO and FELAPTON as wrong, because no particular conclusion can be drawn from two universal premises. Boole's system depends on the fact that A and E propositions are not categorical propositions. They are hypothetical in nature.

The symbolic logic contains some symbols like conjunction, disjunction, negation, material implication and bi-conditional. We can translate an argument into an argument-form with the help of these symbols and determine its validity or invalidity by constructing truth tables.

But the problems are not solved as truth table technique is very mechanical and lengthy as well. A more prudent technique is introduced in logic; compatible with other methods of logic is to derive its conclusions from the premises to evaluate the argument as valid or invalid. This method is called the method of deduction.

The method of deduction has some limitations as an argument containing singular terms cannot be proved to be valid by this method. For example,

All humans are mortal.

Socrates is a man.

Therefore, Socrates is mortal.

This argument may be symbolized as

A

H

Therefore, M.

Such a symbolic form denies the application of the rules of inference and replacement. This problem arises just because of the nature of the terms that the argument contains. It includes general as well as singular terms but while general terms are symbolized, singular terms are not symbolized in the proper way.

To improve this method of deduction, Frege has discovered the quantification theory. The argument mentioned above, can be shown to be valid with the help of quantification theory. This is as follows.

1. $(x) (Hx \supset Mx)$

2. $Hs/$

Therefore, Ms.

3. Hs ⊃ Ms   -1, U. I.

4.   Ms.   -3, 2, M. P.

Logic so far discussed is called First Order Predicate Logic (FOPL) or Classical Two Valued Logic (C_2). Now some philosophical problems arise questioning the acceptability of classical two valued logic as "the" logic. An overview on the history of logic reveals that up to a certain point of time, Aristotelian logic was considered to be the only logic. Soon logicians felt the need for the articulation of new systems of logic due to some problems faced by them which were incompatible with the classical two valued logic. Nicholas Rescher makes the following comment in his famous book, Many Valued Logic.

Throughout the orthodox mainstream of the development of logic in the West, the prevailing view was that every proposition is either true or else false- although which of these is the case may well neither be necessary as regards the matter itself nor determinable as regards our knowledge of it. This thesis, now commonly called the "Law of bivalence", closely bound up with the historic "Law of the Excluded Middle", was, however, already questioned in antiquity. [3] Rescher intends to highlight that Aristotelian logic is a two valued logical system which predominated for a long time. But in due course of time, a non-Aristotelian logic was needed to be developed.

One such problem is the problem of future contingent statements. According to Aristotle, all truths about the past are necessary. A necessary truth is one that could not have been otherwise. It is true under all circumstances. On the contrary a contingent truth is one that is true, but could have been false. A necessary truth is one that must be true; a contingent truth is one that is true as it happens, or as things are. It can be clearly stated that Aristotle recognises the problem of attributing any truth value to the future contingent sentence but he does not speak of any third value. A future tense sentence and its denial are not necessarily true. According to Aristotle, if a future contingent statement is true today, it is necessarily true, and if it is false today, then it is possible.

But some logicians are not ready to accept this view of Aristotle. They hold that future contingent sentences are neither necessary nor impossible. An example of a future contingent statement is 'There will be a sea-battle tomorrow.' This statement is neither true nor false. It cannot be said that the statement is true because the sea-battle might happen or not. Nor can it be considered as false that there will be a sea-battle tomorrow, because it is to admit that there will be a sea-battle tomorrow. And that is not possible to predetermine the occurrence of a sea-battle one day before. It can be said that to find the

truth value of this kind of statement i.e. either true or false, is to subscribe to fatalism. So the classical two valued logic cannot fully explain to future contingent statements.

Now the truths about the past are considered as necessary but truths about the future are contingent. Any future contingent statement is neither true nor false. In the chapter 9, of his treatise On Interpretation (De Interpretation) Aristotle discusses the problem of the logical status of the future contingent propositions. He holds that a future contingent proposition is neither actually true nor actually false, but has a third indeterminate truth value. This idea of assigning a third truth value other than truth and falsity to a proposition gives a way to envisage a new theory of logic which is something different from the bivalent logic and which is properly called pluri-valued or 'many valued logic'. The reflection of this idea is traced in Rescher's writing.

The very idea of truth-values other than the two orthodox truth-values of truth and falsity is obviously central to the conception of a 'many-valued' logic. To obtain such a logic, we must contemplate the prospect of propositions that are neither definitely true nor definitely false, but have some other truth status such as indeterminate or neuter.[4]

 The fact that Aristotle was aware of the problem of future contingency clear from the writings of Susan Haack who presents Aristotle's argument regarding future contingent statement in the following way:

(1) If every future tense sentence is either true or false, then, of each pair consisting of a future tense sentence and its denial, one must be true, the other false.

(2) If, of each pair consisting of a future tense sentence and its denial, one must be true and the other false, then, everything that happens of necessity.

(3) But not everything that happens happens of necessity; some events are contingent.

Therefore, (4) Not every future tense sentences is true or false. [5]

In premise 1, Aristotle intends to hold that if a general sentence or sentences, predicating something of an individual is true, then the denial of the original sentence is false. But it does not hold in the case of particular sentences. Aristotle holds that sentences about past and present tense are bivalent but he is not confident about the bivalency of the future tense sentences.

In premise (2), it is said that if future tense sentences are bivalent, then they are either necessarily true or necessarily false. The third premise of his argument is supposed to hold that everything does not happen necessarily. On the other hand some events are contingent. In conclusion it is proved that future tense sentences are neither true nor false.

Now, in this context two parallel questions may be raised:

Are the other kinds of logical systems part of classical two valued logic?

Is there any such thing as "the basic" logic?

Prof. Susan Haack considers the many valued logic as non-standard logic and are different from classical logic. She raises a question whether these non-standard logical systems are alternatives to classical logic or not.[6]

Susan Haack in Deviant Logic holds that several non-standard logical systems other than C_2 need to be formulated. "There are many systems of logic – many-valued systems and modal systems for instance – which are non-standard; that is, which differ in one way or another from classical logic. Because of plurality of logics, the question whether, or in what way, non-standard systems are '*alternatives*' to classical logic." The requirement of articulation of alternative logic lies in two main points. New non-standard systems are developed either out of purely formal interest or they have been devised out of belief that classical logic is in some way mistaken or inadequate. The perspectives of the different logicians vary in terms of the kind of change of logic. For example, the advocates of many valued logic hold that the theories of many valued logic are alternatives to classical logic. On the other hand, the proponents of modal logic consider that their system may be employed as well as the classical two valued logic. The reason behind this view is that "the former tends to regard classical logic as mistaken, as including assertions which are not true whereas the latter tends to regard classical logic as inadequate."[7] Hence, alternative logical systems may be classified into two broad categories, namely, extended logic and deviant logic. Extended logic is the supplement to the classical bivalent logic. It holds that C_2 is inadequate, so it has to be extended to remove its adequacy. In this system, the vocabulary of classical two valued logic is retained, but some axioms have added to it. "… it seems plausible to expect extended systems to be supplements to classical logic – one would expect the proponent of an extended logic to takes nothing away, but adds new vocabulary in terms of which new theorems are expressible."[8]

On the other hand, deviant logics are alternative logics to classical logic. The upholders of deviant logics consider classical bivalent logic as mistaken, and the mistake is to be rectified. To do so, it is better to set aside or throw away the whole system of classical two valued logic and another system of logic should be built up. "…a Deviant system should have as a theorem the contradictory of a wff which classical logic has as a theorem... However, in accepting, say, 'p or not-p' as a theorem the classical logician is asserting something implicitly general (that, whatever p may be, 'p or not p' is true) and when intuitionist refuses to accept 'p or not p' as a theorem he does so because he thinks that in certain instances 'p or not p' is not true… there is … conflict – something, that is, which the classical logician asserts and the Deviant logicians denies."[9]

Extended logic is compatible with classical logic whereas a rival system is incompatible with C_2. "A rival system is, then, one the use of which is incompatible, and a supplementary system one the use of which is compatible, with the use of the standard system."[10]

Now several questions as discussed by Susan Haack need to be addressed:

a) Is it possible for there to be systems which are genuinely rivals of classical logic? What indeed, might it mean to say that one system rivals another?

b) If there could be systems rivalling classical logic, is it possible that there should be reason to prefer such a rival system? And what kind of reason is a good one?

c) What would be the consequences for the theory of truth, and truth bearers, of the adaptation of a non-standard system?

Now, the theorem sets of two systems L_1 and L_2 are either identical or different in vocabulary. Prof. Haack distinguishes between three relevant possibilities.

a) Let L_1 and L_2 are two classes of wffs; the class of wffs and theorems/ valid inferences of L_2 are a proper subset of class of wffs and theorems/ valid formulas of L_1. The additional theorems/ valid occurrence L_1's additional vocabulary. Then L_1 is an extension of L_2. Prof Haack calls it an extended logic. For example, C2 is an extension of the implicational fragments such as T or the Lewis systems are extensions of classical propositional calculus.

b) The class of wffs of L_1 and the class of wffs of L_2 coincide but the class of theorems/ valid inferences of L_1 differ from those of L_2. In that case, L_1 and L_2 are derivations of each other and if L_2 is classical logic, L_1 is a deviant logic.

c) The class of wffs of L_2 is a proper subset of those of L_1 and theorems/ valid inferences of L_1 and L_2 differ from each other both in the overlapping and non-overlapping areas then L_1 is a quasi- derivation of L_2 and L_1 is a quasi-deviant logic.

Different kinds of extended and deviant logic

Extended Logics are of different kinds. For example; Modal Logic, Deontic Logic, Epistemic Logic, Preference logic, Tense Logic, Imperative Logic and Interrogative Logic. On the other hand, the different varieties of Deviant logic are Many valued logic, Intuitionist logic, Quantum logic, Free logic, Super valuational logic, Minimal logic, Lukasiewitz's three valued logic, Bochvar's many valued logic and Van Fraassen's presuppositional language.

Conclusion

Propositions are considered to be the main constituents of arguments of classical two valued logic. Propositions are either true or false. But future contingent statements are neither true nor false, They are unavoidable as well. We find new approach to welcome new logics which offers huge scope for study in the field of logic.

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3. Copi, Irving. M and Cohen. Carl, op.cit. p. 322.

4. Rescher, Nicholas. *Many Valued Logic*, McGraw-Hill Book Company, New York, 1969. P.1

5. Haack, Susan   Deviant Logic, Cambridge University Press, 1974, p. 73.

6. *Ibid*., p.1.

7. *Ibid*., p.1. Because of this plurality of logics, the question whether or in what way, non-standard systems are alternatives to classical logic, naturally arises.

8. *Ibid.*, 5-6.

9. *Ibid.*, 4

10. *Ibid.*, p. 2.