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"DEONTIC LOGIC" REVIVED:

A NEW LOOK AT VON WRIGHT'S ORIGINAL SYSTEM

by

Carl W. Olson

A DISSERTATION

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INTRODUCTION

For all intents and purposes, the study of deontic logic dates back to G. H. von Wright's initial paper on the subject in 1951.[1] It is true, of course, that there were many writers before von Wright who considered normative issues from a logical perspective, but the rigorous formal investigation of the normative concepts of obligation, permission, and prohibition (and related issues and concepts) to which we now attach the label "deontic logic", began with von Wright. (It was von Wright, in fact, who coined the term.) Not only did von Wright initiate the study of this branch of logic, and stimulate the interest of other philosophers in conducting inquiries of their own, but over the years he has remained in the forefront of the field, and has continued to make significant contributions to its development.

Some of the first inquiries into deontic logic following von Wright's paper came in the form of critical reactions from other writers to the formal system presented in that paper. These criticisms, together with his own further investigations in the field, soon led von Wright to the conclusion that his original system was, in a number of important respects, deficient. His immediate reaction was to construct new systems which he hoped would be free of these deficiencies. In terms of the advance of deontic

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[1] See [1]. (Numbers in brackets correspond to references in bibliography.)

logic, there is little doubt that this sort of reaction was beneficial, for in developing new systems von Wright was forced to examine new approaches to the formal study of the deontic modalities. His inquiries led him to new discoveries and new insights which were, in the long run, far more important to the advance of deontic logic than the defense of a particular system. Nevertheless, my study of von Wright's system, and objections raised against it, leads me to wonder whether he may have been somewhat premature in admitting that the system was, in the final analysis, a failure. For one thing, it seems clear to me that before we can be justified in judging a logical system inadequate, we must establish criteria of adequacy. But we find little concern in von Wright's early works for developing any such criteria. This is explained, in part at least, by the fact that the development of early systems of deontic logic was motivated more by curiosity than by necessity. There were no particular issues in ethics, or in legal philosophy, which were thought to require the construction of a formal theory of normative concepts for their solution. Early deontic logicians were simply interested in finding out whether these concepts could be coherently formalized, and whether there were any interesting logical relationships among these concepts which might be revealed by a formal system.

Since the early systems were developed with no particular issues--and thus with no specific practical applications--in mind, questions of adequacy (if they arose at all) were couched in formal logical terms, rather than in terms of the system's philosophical utility. Thus, when A. N. Prior demonstrates that von Wright's system in inadequate for the purpose of formalizing the concept of moral commitment[2], von Wright responds, not by questioning the need to formalize the concept of commitment, but rather by devising a system in which the concept can be formalized.[3]

Obviously, von Wright's interest at that time was not in developing practical applications for formal deontic systems. Rather, he was interested in developing a system which would be adequate for formalizing the greatest possible range of normative concepts. Perhaps one reason why von Wright did not think, initially, in terms of tailoring deontic systems to deal with specific normative contexts is that he assumed that it was possible to develop a system which formalized all normative concepts. If one criterion of adequacy for deontic systems was that the system facilitate the formalization of all normative discourse, then one would be justified in judging von Wright's system to be inadequate on the grounds that it is incapable of dealing with the notion of commitment. But surely it is as unreasonable

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2 [12].

3 [2].

to suppose that we could develop a system capable of handling all our varied uses of the deontic modalities (obligation, permission, prohibition) as it is to suppose that any one modal system would be adequate for dealing with all our varied uses of the alethic modalities (necessity, possibility, impossibility). It became evident long ago that the alethic modalities are simply too complex and ambiguous to admit of treatment in a single system. We might expect that the same is true of the deontic modalities.

If we begin with the assumption that no deontic system which we can construct will enable us to deal with every deontic concept, then perhaps we will see objections like that raised by Prior in a different light. As I see it, the interesting question with respect to the Prior objection is not whether Prior is correct in maintaining that the relation of commitment cannot be expressed in von Wright's system (we shall see later that he is), but whether his objection is sufficient grounds for abandoning the system. It is not immediately apparent that it is. What Prior has shown at most, it seems to me, is that von Wright's system is not adequate for dealing with those contexts in which the notion of commitment plays an essential role. But there is no reason to suppose that the concept plays an essential role in <u>every</u> normative context. Perhaps there are contexts in which von Wright's system would be both adequate and enlightening.

It is this question--whether there are normative contexts of which von Wright's original system may be regarded an adequate formalization--which will provide the central focus of this essay. I will proceed by examining the major objections which have been raised against the system--both by von Wright, and by other writers--in an attempt to determine whether any of them constitutes sufficient grounds for abandoning the system. To put it another way, I will attempt to determine whether the original system can be regarded, in spite of the objections which have been raised against it, as a viable deontic system.

Such an exercise is justified, I think, not by the significance of the system itself--no profound issues turn on whether we accept it or reject it, and no one's professional reputation hangs in the balance--but rather by what we stand to gain from it in terms of increased understanding of the issues involved in the construction of deontic systems.

Following is a brief enumeration of the major issues which will be examined in this essay:

1. Interpretation of the variables--The variables of von Wright's original system represent the names of generic acts. In most subsequent deontic systems (both those of von Wright, and those developed by other writers) the variables represent propositions (or "proposition-like" entities). It

is von Wright's contention in later publications[4] that because of certain formal features of the original system, taking the variables to represent the names of acts commits one to a trivialized concept of action. Whether this is a valid point is a question we will consider in Chapter Two.

2. Interdefinability of the operators--In the original system, the O- and P-operators (for obligation and permission respectively) are interdefined. In later publications[5], von Wright wrestles with the question whether the concept of permission is, in all contexts, definable in terms of obligation, or whether there is a sense of permission which is independent of the concept of obligation, and which must be represented by an independent operator. We will also discuss in Chapter Two the relevance of this issue to the assessment of the original system.

3. The paradoxes--The anomoly which Prior discovers in von Wright's system he refers to as the Paradox of Derived Obligation. (Prior discusses another "paradox" which I have not mentioned, and which need not concern us. Thus, his title, "The Paradox*es* of Derived Obligation".) There are a number of other deontic paradoxes which are widely discussed in the literature, including Ross's Paradox, The Paradox of Free-Choice Permission, and the Good Samaritan Paradox. Surely, one measure of the adequacy of a formal system is

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[4] See [10] in particular.

[5] Primarily, [3] and [7].

the degree to which it is free of counterintuitive and paradoxical consequences. In Chapter Three, I will attempt to determine whether any of the standard deontic paradoxes are embodied by von Wright's system.

4. The McLaughlin criticism--In a critical note in Mind[6], R. N. McLaughlin argues that one of the formulas which is provable in von Wright's system (and the truth of which von Wright regards as intuitively obvious) in fact admits of false instances. In Chapter Four, I will undertake a detailed investigation of the impact of the McLaughlin criticism on our understanding of von Wright's system. The conclusions reached as a result of this investigation will form the basis of an interpretation of the system which will be developed in Chapter Five.

5. The van Fraassen criticism--In a paper in the Journal of Philosophy[7], B. C. van Fraassen presents an argument to show that one of the basic principles underlying many systems of deontic logic--including von Wright's original system--reflects an ethical bias on the part of the systems' devisors, and that the principle is therefore not an appropriate basis upon which to construct a deontic system. In Chapter Six, I will attempt to determine whether van Fraassen's argument constitutes a valid criticism of von Wright's system.

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[6] [11].

[7] [15].

Dealing with all of these issues will require considerable exposition of von Wright's system. It is possible that at times my exposition will be at odds with von Wright's own conception of the system. This possibility does not concern me, since I am more interested in presenting a helpful and enlightening treatment of the relevant issues, than in providing an accurate picture of the inner workings of von Wright's mind at the time he was constructing the system.

CHAPTER ONE

THE ORIGINAL SYSTEM

What distinguishes deontic systems from other types of logical systems is the presence of the deontic operators--typically O and P--which stand, roughly speaking, for the concepts of obligation and permission. And what distinguishes one deontic system from another, to a large extent, is the way in which the deontic operators are formulated--whether they are monadic or dyadic, for example, and whether they attach to statements or some other kind of expression.

In von Wright's original system[1] (which we will refer to throughout as DL) O and P are monadic operators attaching to expressions which are to be construed as names of acts. The expressions which are generated by attaching one of the deontic operators to the name of an act are what von Wright calls "deontic propositions".

The letters A, B, etc., represent the names of acts. In this context "act" is understood to refer to acts in the generic sense, as opposed to the specific acts of specific agents. Smoking, murder, and theft are von Wright's examples of acts in this sense. Particular instances of any of these acts are called act-individuals.

'A' is an atomic act name. We can form molecular complexes of act names much as we form molecular formulas in

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1 [1].

the propositional calculus. In DL, along with their usual interpretation, the standard truth-functional connectives are given a performance-functional interpretation as well, and are used to generate molecular act names.

The definitions of the various performance functions are analogous to those of the corresponding truth functions. Where 'A' is the name of an act, for example '∼A' is the negation-name of that act. ∼A is performed (by a given agent) just in case A is not performed. 'A v B' is the disjunction-name of acts A and B. It is performed just in case A is performed or B is performed. Similarly, 'A & B' is the conjunction-name, 'A→B' the implication-name, and 'A↔B' the equivalence-name of the acts A and B.

Notice that since 'A', 'A v B', etc., represent names of acts, and not statements or propositions, they are not well-formed formulas of DL.

The operator P is primitive in DL. 'PA' expresses the proposition that the act named by 'A' is permitted. (The notion of permission is not elaborated.) '∼PA' expresses the proposition that A is not permitted, or in other words, that A is forbidden. When the negation-act of A is forbidden we can say the act itself is required, or obligatory. Thus an expression which is equivalent to '∼P∼A' is 'OA'. We see, then, that P is the only undefined operator which is required in DL. (Of course, O could just as well have been taken as undefined and the other operators defined in terms of it.)

With this symbolism a number of deontic concepts can, ostensibly, be formalized. An act A is said to be morally indifferent if it and its negation-act are both permitted. This is expressed 'PA & P∼A'. Two acts are morally compatible in case their conjunction-act is permitted--'P(A & B)'; their incompatibility would be expressed by '∼P(A & B)'. The idea that one act commits us to another can be expressed by 'O(A→B)', or equivalently by '∼P(A &∼B)'.

O- and P-sentences are true-false expressions which are subject to the laws of truth-functional logic. DL is thus an augmented propositional calculus, and any molecular complex of O- and P-sentences can be assessed by standard PC techniques to determine whether it is logically true in PC. The more interesting question of course is whether an O- or P-sentence, or complex of O- and P-sentences is logically true in DL. Indeed, one might question whether there are any logical truths which are peculiar to DL. It is not a question which von Wright takes seriously in this context, however, for he suggests that in some cases our intuition suffices to demonstrate that complexes of O- and P-sentences (which are not truths of PC) are logically true. His example is:

$$(OA \ \& \ O(A \rightarrow B)) \rightarrow OB.$$

This says that if an agent is obligated to perform an act A, and the performance of A commits him to the performance of B, then the agent also has an obligation to perform B.

Whether or not intuition is sufficient to decide isolated cases, it is obvious that a formal decision procedure is required. The procedure which von Wright develops depends on his Principle of Deontic Distribution:

"If an act is the disjunction of two other acts, then the proposition that the disjunction is permitted is the disjunction of the proposition that the first act is permitted and the proposition that the second act is permitted."[2]

This principle reflects the fact that a disjunction-act, say A v B, is not only a performance function, but also what von Wright calls a <u>deontic function</u> of its components, A & B; that is, the deontic value("permitted" or "forbidden") of the disjunction-act is uniquely determined by the deontic values of its components. A v B is permitted just in case at least one of the disjuncts is permitted, and we know that A v B is forbidden just in case both disjuncts are forbidden (von Wright claims).

Notice, however, that neither negation-acts, nor conjunction-acts are deontic functions of their component acts. From the fact that A is permitted we can infer nothing about the deontic value of ∼A. A and ∼A could each be permitted, or differ in deontic value. Also although we can infer that A & B is forbidden if at least one conjunct is forbidden, we cannot infer from the fact that A and B are each permitted, that A & B is permitted. It could be that the two acts are individually permitted, yet (morally) incompatible.

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2 [1], p. 308.

Beside the Principle of Deontic Distribution, the decision procedure for DL also depends on the fact that every molecular act-name has a perfect disjunctive normal form (PDNF). The PDNF of an act-name consists of a disjunction (possibly 0- or 1-termed) of conjunctions, with each conjunction containing the name or negation-name of each of the component acts of the original molecular act-name.

The PDNF of A→B, for example is the following 3-termed disjunction:

$$(A \,\&\, B) \vee (\sim A \,\&\, B) \vee (\sim A \,\&\, \sim B).$$

The PDNF of A v B is:

$$(A \,\&\, B) \vee (A \,\&\, \sim B) \vee (\sim A \,\&\, B).$$

Where the original molecular complex contains _n_ act-names, there are 2^n possible conjunction-names which might occur in the PDNF. If all 2^n conjunction-names occur in the PDNF, the original complex is called an act-tautology. An act-tautology is an act which is performed regardless of the performance functions of the component acts. If the PDNF is a 0-termed disjunction, then the original complex is an act-contradiction, or one which is never performed.

For any given P-sentence P_c_, the expression _c_ (whether it be an atomic act-name or a molecular complex of act-names) has a PDNF. In virtue of the Principle of Deontic Distribution, the P-operator can be distributed over the terms of the PDNF of _c_. The new P-sentences which result are called

the P-constituents of the original P-sentence. In general, a P-sentence expresses a truth-function of its P-constituents.

Consider the expression 'P(A→B)' as an example. The complex 'A→B' is replaced by its PDNF:

$$P((A \mathbin{\&} B) \vee (\sim A \mathbin{\&} B) \vee (\sim A \mathbin{\&} \sim B)).$$

The P-operator is distributed over the disjuncts of the PDNF:

$$P(A \mathbin{\&} B) \vee P(\sim A \mathbin{\&} B) \vee P(\sim A \mathbin{\&} \sim B).$$

The expressions 'P(A & B)', 'P(∼A & B)', and 'P(∼A & ∼B)' are thus the P-constituents of P(A→B).

Since the O-operator is defined in terms of the P-operator (as '∼P∼') it is possible to rewrite any O-sentence as the negation of a P-sentence. The P-constituents of this P-sentence, then, are also the P-constituents of the original O-sentence. Thus, as with P-sentences, any O-sentence expresses a truth function of its P-constituents.

Given any molecular complex of O- and/or P-sentences, we determine its P-constituents in the following way. Any O-sentences in the complex are replaced by negated P-sentences. For each P-sentence in the new expression, its P-constituents are then determined in terms of all the atomic act-names occurring in the entire original expression. If there are $\underline{n}$ distinct atomic act-names in the original molecular complex, then it has a maximum of 2^n P-constituents, each of which is expressed by the P-operator followed by an $\underline{n}$-termed conjunction of atomic act-names and/or their negations. The

molecular complex is clearly a truth function of its P-constituents.

The 2^n P-constituents which can be generated for any $\underline{n}$ atomic act-names are logically independent of one another, with one proviso. We would probably want to deny, von Wright claims, that all 2^n constituents could be jointly false, for if they could we would have to accept (where $\underline{n}$ = 1) that '~PA & ~P~A' is a possible state of affairs--that is, that both A and ~A are forbidden, or that A is both forbidden and obligatory.

This consideration leads von Wright to formulate the Principle of Permission: "Any given act is either itself permitted or its negation is permitted."[3]

Since any complex of O- and/or P-sentences is a truth function of its P-constituents, we can determine which truth function by means of a standard truth table. In so doing, we need only observe the restrictions imposed by the Principle of Deontic Distribution and the Principle of Permission. The analysis of a molecular O-P-expression by means of a standard truth table, restricted in this way, provides a decision procedure for DL. A truth of DL, then, is simply a molecular complex of O- and/or P-sentences which expresses the tautology of the propositions expressed by its P-constituents, that is, one which is true regardless of the truth values of its P-constituents.

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[3] [1] , p. 309.

Von Wright illustrates this procedure by assessing the same expression which he gave as an example of a truth of DL, namely:

$$(OA \,\&\, O(A \rightarrow B)) \rightarrow OB.$$

It will serve our purposes to use the same example.

We first compile a list of all the atomic act-names occurring in the expression. There are two--A and B.

Next we determine the P-constituents of each of the component O- and P-sentences in terms of these two atomic act-names. There are three components: OA, O(A→B), and OB. We proceed as follows:

(1) Eliminate all occurrences of the O-operator.

(2) Rewrite the resulting expression, replacing the atomic or molecular act-name within it by its PDNF in terms of the two act-names A and B.

(3) Distribute the P-operator according to the Principle of Deontic Distribution.

Following the three steps for OA, we obtain:

(1) $\sim P \sim A$

(2) $\sim P((\sim A \,\&\, B) \vee (\sim A \,\&\, \sim B))$

(3) $\sim (P(\sim A \,\&\, B) \;\vee P(\sim A \,\&\, \sim B))$

For O(A→B):

(1) $\sim P \sim (A \rightarrow B)$

(2) $\sim P(A \,\&\, \sim B)$

(3) $\sim P(A \,\&\, \sim B)$

For OB:

(1) $\sim P \sim B$

(2) $\sim P((A \,\&\, \sim B) \vee (\sim A \,\&\, \sim B))$

(3) $\sim (P(A \,\&\, \sim B) \vee P(\sim A \,\&\, \sim B))$

Thus, the P-constituents for the original expression are $P(A \,\&\, \sim B)$, $P(\sim A \,\&\, B)$, and $P(\sim A \,\&\, \sim B)$. Since we have listed only three of the four possible P-constituents relative to A and B ('$P(A \,\&\, B)$' is missing), the restriction imposed by the Principle of Permission does not apply. We are free then to construct a truth table in the usual way. The expression to be analyzed is the following:

$$(\sim (P(\sim A \,\&\, B) \vee P(\sim A \,\&\, \sim B)) \,\&\, \sim P(A \,\&\, \sim B)) \rightarrow \sim (P(A \,\&\, \sim B) \vee P(\sim A \,\&\, \sim B))$$

The completed truth table for this expression will be found on the following page.

Von Wright enumerates a number of propositions which can be shown by this modified truth-table technique to be "laws" of DL. I will simply list them here for reference.

On the relation between the O and P operators--

(a) $PA \rightarrow \sim O \sim A$

(b) $OA \rightarrow PA$

"Dissolution" of O- and P-sentences--

(c) $O(A \,\&\, B) \leftrightarrow (OA \,\&\, OB)$

(d) $P(A \vee B) \leftrightarrow (PA \vee PB)$

(e) $(OA \vee OB) \rightarrow O(A \vee B)$

(f) $P(A \,\&\, B) \rightarrow (PA \,\&\, PB)$

P(A & ~B)	P(~A & B)	P(~A & ~B)	(~	(P(~A & B)	v	P(~A & ~B))	&	~	P(A & ~B))	→	~	(P(A & ~B)	v	P(~A & ~B))
T	T	T	F	T	T	T	F	F	T	T	F	T	T	T
T	T	F	F	T	T	F	F	F	T	T	F	T	T	F
T	F	T	F	F	T	T	F	F	T	T	F	T	T	T
T	F	F	T	F	F	F	F	F	T	T	F	T	T	F
F	T	T	F	T	T	T	F	T	F	T	F	F	T	T
F	T	F	F	T	T	F	F	T	F	T	T	F	F	F
F	F	T	F	F	T	T	F	T	F	T	F	F	T	T
F	F	F	T	F	F	F	T	T	F	T	T	F	F	F