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It implies that no new legal system could get started. None could break off from another lawfully, and all that broke off unlawfully would be eternally barred from becoming lawful themselves.[33]

Any regime to be called lawful must have an infinite genealogy.
The requirements of the inference model that every new rule be authorized by a prior, superior rule, and that none be self-authorized, quickly proves its inapplicability to real legal systems. This view entails that no legal rule could validly come into being without an infinite genealogy. The inference model cannot explain the legal origins of any legal system, or permit any revolutionary regime to become lawful.

Suber errs in thinking that a norm that cannot be amended is necessarily immutable. He confuses internal with external change. Within a system one can hold that there are immutable norms and that the inference model, or something very much like it, accounts for the validity of the norms *of the system*. But it is wrongheaded to think that the criteria which apply to change within the system apply to changing the system itself. For Suber, the inference model of validity must apply to both framework internal questions *and* questions about the choice of a framework, but this is not correct. Internal and external questions are of a different logical type, and the criteria for a good answer to one need not be the same as the criteria for a good answer to the other. The presupposed *Grundnorm*, and the inference model associated with it, accounts for change *within* a legal system and does so without paradox. Ross does not address directly questions of change of legal systems, but there an acceptance model works.

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33 Suber (1990), Preface to the Printed Edition, p. 3.

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Anderson's Reduction and Kelsen's Normativism*

0. Introduction

This paper is intended to consider whether Anderson's reduction can serve as an adequate logical foundation for Kelsen's theory of structure of legal norms. At first, I will outline Anderson's reduction of deontic logic to alethic modal logic (1) and indicate the resemblance between Anderson's reduction schema and Kelsen's reduction of secondary norms to primary norms (2); then I will try to explicate Kelsen's notion of causal and normative necessity (3). Finally, I will point out the difficulty of using Anderson's approach to formalize Kelsen's structure of legal norms and propose a tentative solution based on von Wright's distinction between the deontic Ought and the technical Ought (4).

1. Anderson's Reduction of Deontic Logic to Alethic Modal Logic

Alan Ross Anderson proposed in Anderson 1958, 1967 to reduce deontic logic to alethic modal logic by means of a reduction schema

(1.1) $\boldsymbol{OA} =_{df} \boldsymbol{N}(\neg A \rightarrow \boldsymbol{S})$,

where $\boldsymbol{S}$ is a propositional constant and $\boldsymbol{N}$ is the modal necessity operator. Anderson interprets $\boldsymbol{S}$ as 'sanction' or some 'bad state of affairs'. This well-known reduction schema says: '*A* is obligatory if and only if it is necessary that not *A* implies the sanction S.' In other words, 'the violation of duty leads necessarily to the sanction.' Anderson proved that the axioms of the standard system of deontic logic are deducible in normal modal logic from (1.1) and the axiom

(1.2) $\neg \boldsymbol{NS}$

with help of an additional definition

(1.3) $\boldsymbol{S} = df\ \boldsymbol{B} \& \neg \boldsymbol{NB}$

(1.2) says the sanction is avoidable, i.e., not everything is forbidden or obligatory. $\boldsymbol{B}$ is a primitive, uninterpreted propositional constant. Thanks to the definition (1.3) (1.2) can be transformed to '$\neg \boldsymbol{N}(\boldsymbol{B} \& \neg \boldsymbol{NB})$', which is derivable from the *T*-axiom of normal modal logic:

T-axiom: $\boldsymbol{NA} \rightarrow A$.

Hence it is superfluous to add the axiom (1.2). In this way the standard system of deontic logic can be reduced to alethic modal logic such as *T* (or its extensions *S4*, *S5*) with the additional definitions (1.1) and (1.3).

The idea behind Anderson's reductionistic approach is as follows:

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'It is characteristic of normative systems to select from among the possible alternatives available to agents in a social group, certain possibilities as required or *obligatory*, others as *permitted* (but not obligatory), others as *forbidden*, others as *indifferent*, etc. From the point of view of the behavioral sciences, among the first questions that arise in any actual system, is the following: what penalties or sanctions does the social group use to enforce its norms? A similar question arises in positive law: in drafting a statute in which, e.g., some possible course of action is to be forbidden, an integral part of the statute is an explicit statement of the penalty or penalties to be incurred by those who fail to comply with the directive.' (Anderson 1967, 170. Anderson's emphasis)

An interesting parallel to Anderson's reduction schema can be found in Kelsen's distinction between primary and secondary norms. In the following I will investigate whether Anderson's approach can serve as an adequate logical foundation for Kelsen's theory of the structure of legal norms.

2. Kelsen's Distinction between Primary and Secondary Norms

Kelsen calls the normal deontic operators -such as obligation, prohibition, and permission- the functions of norms. If the deontic operators are regarded as the functions of norms, the following question arises: How is a certain form of behavior obligated or forbidden through a norm? Kelsen's answer to this question is:

'The law commands a certain behavior simply by attaching to the opposite behavior a coercive act as sanction, so that the behavior can be considered legally 'commanded'- i.e. the content of a 'legal duty'- only when the opposite behavior is the condition to which a norm attaches a sanction.' (Kelsen 1991, 142-143)

Because the sanction consisting in a coercive act plays a decisive role in the law, which is a coercive order, Kelsen makes a distinction between the primary and the secondary norm: The norm commanding or prohibiting a certain form of behavior is called the secondary norm; the norm prescribing a sanction for the violation of the secondary norm is called the primary norm (Kelsen 1992, 29-30; 1991, 56-57, 142-143). The primary norm has a hypothetical or conditional structure:

(2.1) *If not-A, S ought to be*,

where not-A stands for the legal condition and ***S*** for the legal consequence, i.e. the sanction.

The secondary norm corresponding to (2.1) is formulated as follows:

(2.2) *A is obligatory*,

in other words, not-*A* is forbidden.

The main addressee of the primary norm is an empowered legal official, e.g. a judge; the addressee of the secondary norm is a legal subject. Since a modern legislator usually formulates only the primary norms expressively, the secondary norm, according to Kelsen, is in fact 'superfluous' and already 'implicit' in the primary norm.(Kelsen 1991,142). Kelsen's reduction of the secondary norm to the primary norm indicates that Anderson's reduction coincides with Kelsen's distinction between primary and secondary norms and it seems that with Anderson's reduction schema, one can formalize Kelsen's structure of norms adequately. However, it is too early to draw this conclusion. The decisive problem of the adequate interpretation of the necessity operator in Anderson's reduction schema remains untouched as yet. To solve this problem, we have to look into Kelsen's distinction between causal and normative necessity.

3. Causal and Normative Necessity

According to Kelsen, the primary form of the legal norm always has a hypothetical or conditional structure. Unlike material implication, the legal norm (more correctly: the proposition of legal norm or legal norm-proposition, German: *Rechtssatz*) expresses an intensional connection between the antecedent (the legal condition) and the consequence (the legal consequence). Kelsen calls this connection 'Ought', which is analogous to the causal connection in laws of nature but has, instead, normative meaning. In Kelsen's later theory, 'Ought' is the expression of normative necessity and 'Must' is the expression of causal necessity (Kelsen 1991, 9-12, 22-23). Laws of nature say: 'If *A* is, then *B* must be', or 'If *A* is, then *B* is (or will be).' But propositions of legal norms say: ' If *A* is, then *B* ought to be', even though *B* is perhaps not forthcoming. Shortly: What ought to be need not actually occur. A difference between causal and normative necessity in Kelsen's theory is found at the logical-semantic level. Whereas the law of nature is an Is-statement (*Sein-Aussage*), the proposition of a legal norm is an Ought-statement (*Soll-Aussage*). Both types of statements are logically independent of each other[1]. Another difference between causal and normative necessity is as follows: A law of nature is to be revised or abandoned, if its consequence does not actually take place. However, if the legal consequence ought to but does not actually occur, the description of the normative connection need not be revised. This difference between legal norm-propositions and laws of nature is clearly summarized in the second edition of *Reine Rechtslehre*:

'If a fact is found that is in conflict with the law of nature, then science must abandon that law as inaccurate and replace it by another that conforms with the fact. But if some behavior is not in conformity with the legal norm-provided such behavior is relatively infrequent- the science of law has no reason to regard as invalid the violated legal norm, no reason to replace the legal norm-proposition[2] describing the law by another legal norm-proposition. The laws of nature formulated by natural science *must* conform to the facts, but the facts of human action and refrainment *ought* to conform to the legal norms described by the science of law.' (Kelsen 1970, 88. Kelsen's emphasis)

A statement of natural science such as 'If a metal is heated, it expands' describes the causal linking of the condition (the cause) with the consequence (the effect). Under the influence of David Hume, Kelsen regards the causal connection not as an absolute but as a 'relative' necessity:

'According to our experience hitherto, it is impossible for a metal to be heated without expanding, though it is possible of course that our experience might change and that our description of the causal linking might have to be changed. This is so even when-as is often the case in modern physics- the necessity of the causal linking is not absolute but only relative, i.e. is only probable.'(Kelsen 1991, 22. Kelsen's emphasis)

The linking of the condition with the consequence in a legal norm proposition such as 'If someone borrows money, he is to repay it' is normative necessity, which is expressed not by 'Must', but by 'Ought'. It is possible for someone to borrow money and not to repay it, but the violated legal norm will not be regarded as invalid for this reason (Kelsen 1991 22).

1 In the second edition of *Reine Rechtslehre*, Kelsen formulated this thesis as follows:
' Nobody can deny that the statement: "something is"- that is, the statement by which an existent fact is described- is fundamentally different from the statement: "something ought to be"-which is the statement by which a norm is described. Nobody can assert that from the statement that something is, follows a statement that something ought to be, or vice versa.' (Kelsen, 1970, 5–6)

2 The German terminology '*Rechtssatz*' is misleadingly translated as 'the rule of law' in the English translation of the second edition of *Reine Rechtslehre*.

If Anderson's reductionistic approach is to serve as an adequate logical foundation of Kelsens structure of legal norms, one cannot escape the following problem: Is the necessity operator ***N*** in Anderson's reduction schema to be interpreted as causal necessity or as normative necessity? In what follows, the basic idea of the semantic of modal logic (the Kripkean-semantic) will be introduced to explicate the notion of causal and normative necessity[3].

An ordered pair $<W, R>$ is called a model structure, where W is a non-empty set of possible worlds and R is a binary accessiblity relation defined over W. ***NA***, where A is a sentence, will be said to be true in a possible world w if and only if A is true in every possible world $w' \in W$ such that wRw'. So the notion of necessity is relativized by the R-relation. Now we are in a position to define causal necessity as a specific relative necessity. Let $K(w)$ be a non-empty finite class of sentences which may contain quantifier but may not contain ***N***. $K(w)$ is thought of as the class of laws of nature or the class of causal laws in the world w. Disagreements over the semantic criterion distinguishing the causal sentences from other kinds of sentences can be set aside here. We further assume that the causal laws may differ from one possible world to the next. We use Rk to denote the accessibility relation with respect to causal necessity and define this relation as follows:

(3.1) For all $w, w' \in W$, $w\ Rk\ w'$ if and only if w' is compatible with the causal laws of w.

$w\ Rk\ w'$ can be read as 'w' is a physical alternative to w' or 'w' is a physically possible world with respect to w'. If ***N*** is interpreted as causal necessity, the rule of valuation for ***NA*** (A is causal necessary) is defined as follows:

(3.2) ***NA*** (A is causal necessary) is true in a possible world w if and only if A is true in every possible world $w' \in W$ such that $wRkw'$.

In other words: The sentence 'A is causal necessary' is true in a possible world w if and only if A is true in every physically possible world with respect to w. The relativity of causal necessity is obvious: The singular causal assertion 'The metal X expands through heating' holds necessarily in our actual world because it is true in all possible worlds that are compatible with the causal laws in our actual world, but it is not necessary true in another possible world in which (or in one physically possible world relative to which) the statement 'If a metal is heated, it expands' is refuted. It is also obvious that Rk is reflexive: Every possible world is compatible with its own laws of nature, i.e. what is actually true is also physically possible. Thus the T-axiom is valid in the structure $<W, Rk>$.

Normative necessity is defined in a similar way. A selected element $w \in W$ denotes the actual world. Let N be the class of the propositions of legal norms in the actual world w. Let IN be the class of the statements about the behavior (or the states of affairs) which ought to take place according to N. We use Rn to denote the accessibility relation with respect to normative necessity and define this relation as follows:

(3.3) For all $w' \in W$, $w\ Rn\ w'$ if and only w' is a model for IN.

$w\ Rn\ w'$ can be read as 'w' is a deontic alternative to w'. Deontic alternatives to w are also called 'deontically perfect worlds' or 'ideal worlds' in which all obligations in w are

3 On the model theoretical approach to causal necessity, see Montague (1974); Føllesdal (1966).

fulfilled. If ***N*** is interpreted as normative necessity, the rule of valuation for ***NA*** is defined as follows:

(3.4) ***NA*** (*A* is normative necessary) is true in an actual world *w* if and only if *A* is true in every possible world $w' \in W$ such that *wRnw'*.

In other words: The sentence '*A* is normative necessary' is true in an actual world *w* if and only if *A* is true in every ideal world with respect to *w*.

The formal parallel between casual and normative necessity was explicated in the above way. But it cannot be required that *Rn* be reflexive: the actual world cannot be the deontically perfect world of itself, for the actual behavior does not always comply with the norms. Thus '$\boldsymbol{NA} \rightarrow A$' is false in an actual world in which a norm is violated, if ***N*** is interpreted as normative necessity. The *T*-axiom is not valid in a structure $<W, Rn>$. This result corresponds to Kelsen's Is-Ought-dualism. Another condition for *Rn* can be added: For each possible world $w \in W$, there is at least one deontically perfect world with respect to *w*, i.e. *Rn* is serial. Then ***N*** is the same as the operator ***O*** in the standard system of deontic logic.

4. Deontic and Technical Ought: An Alternative Version of Anderson's Reduction Schema

If we formalize Kelsen's primary norm in the form of $\boldsymbol{N}(\neg A \rightarrow \boldsymbol{S})$, then there are two possible interpretations of the necessity operator ***N***:

If ***N*** is interpreted as causal necessity, the primary norm will be like a law of nature, which predicts future events and is confirmed by actual events. Kelsen's normativism and his distinction between laws of nature and propositions of legal norms collapse in this case. Moreover, '$\boldsymbol{NA} \rightarrow A$' is valid under this interpretation. This means $(\neg A \rightarrow \boldsymbol{S})$ is deducible from $\boldsymbol{N}(\neg A \rightarrow \boldsymbol{S})$. Thus ***S*** follows from $\boldsymbol{N}(\neg A \rightarrow \boldsymbol{S})$ together with $\neg A$, in other words, if the legal condition is ascertained, then the sanction always follows in the actuality. For this reason, Kelsen's Is-Ought-Dualism cannot hold, if ***N*** is interpreted as causal necessity. If, on the other hand, ***N*** is interpreted as normative necessity, the *T*-axiom is no longer valid. Then Anderson's axiom (1.2) cannot be reduced to a theorem of alethic modal logic. In this case, ***N*** is the same as the deontic operator and Anderson's reduction loses its significance. The main problem results in a dilemma: Either Kelsen's normativism cannot be sustained, or the necessity operator in the reduction schema is to be interpreted as normative necessity, in which case Anderson's reduction would be trivial. A tentative way out of this dilemma will be proposed in the following.

If one insists on Kelsen's normativism and interprets ***N*** as normative necessity, then ***N*** is nothing other than the deontic operator ***O***. If the necessity operator ***N*** in the reduction schema is replaced by ***O***, we obtain a curious definition '$\boldsymbol{OA} =_{df} \boldsymbol{O}(\neg A \rightarrow \boldsymbol{S})$'. What is the relation between both operators ***O*** in this definition? In other words, what is the relation between being-obligatory (*Gebot-sein*) and ought-to-be(*Gesollt-sein*)? Following von Wright, I will call the ***O*** in the primary norm '$\boldsymbol{O}(\neg A \rightarrow \boldsymbol{S})$' the '*deontic Ought*' and the ***O*** in the secondary norm '***OA***' the '*technical Ought*'[4]. Now the above-mentioned question arises in the following form: What is the relation between the deontic Ought and technical Ought?

4 On deontic and technical Ought, see von Wright (1983), 152–155; (1985), 273–277.

The key to this problem is von Wright's notion of practical necessity. From the perspective of the addressee of the secondary norm, i.e. a legal subject, the primary norm can be read as '$O(A \vee S)$', which means: In every ideal world with respect of this primary norm, it is always the case that *A* or *S*. The legal subject *must* do *A* as to satisfy the primary norm, if he wants to avoid the sanction, i.e. under the condition $\neg S$[5]. This 'Must' is a technical Ought, the expression of practical necessity, and the secondary norm is an elliptic statement the full meaning of which is that unless this thing (the means) is done, something else (the end) will fail to be the case (von Wright 1983, 153; 1994, 54). The assumed end of the secondary norm is the satisfaction of a valid primary norm, which can be understood as the objective purpose (*objektiver Zweck*) in Kelsen's sense:

' An objective purpose is one that ought to be realized, that means, a purpose that has been stipulated by a norm regarded objective valid.' (Kelsen 1970, 23)

The Ought in the primary norm is not the expression of practical necessity, but that of the normative necessity without the elliptic character, even if the primary norm is created in order to achieve or to realize certain social goals. According to Kelsen, the Ought of the primary norm, the deontic Ought, is *sui generis* and is not reducible to the 'Must', the expression of the end-means-relation. The validity of a primary norm is conditional upon the act of will by which it is created, but it is not justified by the goals that the agent of the law-creating act wants to achieve (Kelsen 1970, 102-105; 1991, 10-18). Practical necessity is called 'teleological necessity' and is regarded as a kind of causal necessity by Kelsen. It cannot justify the validity of norms and must be distinguished from normative necessity (Kelsen 1991, 10–12). Is the proposal to regard the secondary norm as technical norms completely incompatible with Kelsen's normativism? The answer does not seem obviously to be positive. This is, because the secondary norm as a technical norm always presupposes the existence of an objective end, i.e. the satisfaction of a primary norm, of which the validity or the 'Ought' is irreducible to the end-means-relation or to the 'Must'. The norm commanding or prohibiting a certain form of behavior is only a secondary or a 'derived' obligation, if it serves as a means to satisfy the primary norm. Therefore a technical Ought always states 'a fact which is internal to the assumed existence of a normative ought.' (von Wright 1985, 277)

Therefore, it is not the deontic Ought, but rather the technical Ought that is reducible. The reduction of the technical Ought in a secondary norm always presupposes an irreducible deontic Ought, whose realization is the assumed end of the technical Ought. We use Ot to denote the technical Ought. The reducible character of the secondary norm can be formulated in von Wright's way as follows (von Wright 1994, 54):

(4.1) $OtA =df N(Z \rightarrow A)$,

where Z means the end from the perspective of a legal subject, i.e. the satisfaction of the primary norm under the condition of avoiding the sanction.

The structural resemblance between (4.1) and Anderson's reduction schema can be easily seen. The differences are that the deontic operator in (4.1) is the expression of the technical Ought and the propositional constant is Z instead of S. Furthermore, an axiom corresponding to (1.2) is to be added:

(4.2) $\neg N \neg Z$

5 Another interpretation is as follows: There are two possibilities to satisfy the norm $O(A \vee S)$: Doing *A* or doing *S*. But it is impossible for a legal subject to impose the sanction, because he is not empowered to do it. Therefore the both alternatives to fulfilling the primary norm are reduced to only one: The legal subject can only do *A*, in other words, he has to do *A* as to fulfill the primary norm.

(4.2) says that the assumed end is always attainable, in other words, it is possible to fulfill the primary norm.

In (4.1), (4.2) the necessity operator ***N*** can be regarded as practical necessity under the adequate interpretation. A rational reconstruction of practical necessity will be treated elsewhere[6].

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6 The reconstruction can be only sketched here as follows:

An action-tree is an ordered pair $<W, \prec>$, where $\prec$ is a non-linear, irreflexive, asymmetric, and transitive relation defined over W and with the following condition: If $w' \prec w$ and $w'' \prec w$, then $w' \prec w''$ or $w'' \prec w'$ or $w'=w''$. $\prec$ can be regarded as the transformation from one world to another (through the action). An action-trajectory is a chain on the action-tree. Let Hz be the set of those action-trajectories h whose initial-state is the world in which the agent is actually and whose end-state is a world in which Z is true. Let w be an end-state of $h \in Hz$. A will said to be true (intuitively, A is performed) in h if and only if there is a $w' \in h$ ($w=w'$ or $w' \prec w$) such that A is true in w'. $\mathbf{Np}(A/Z)$ means that A is practically necessary for the end Z. $\mathbf{Np}(A/Z)$ will be said to be true if and only if A is true in h for every $h \in Hz$.