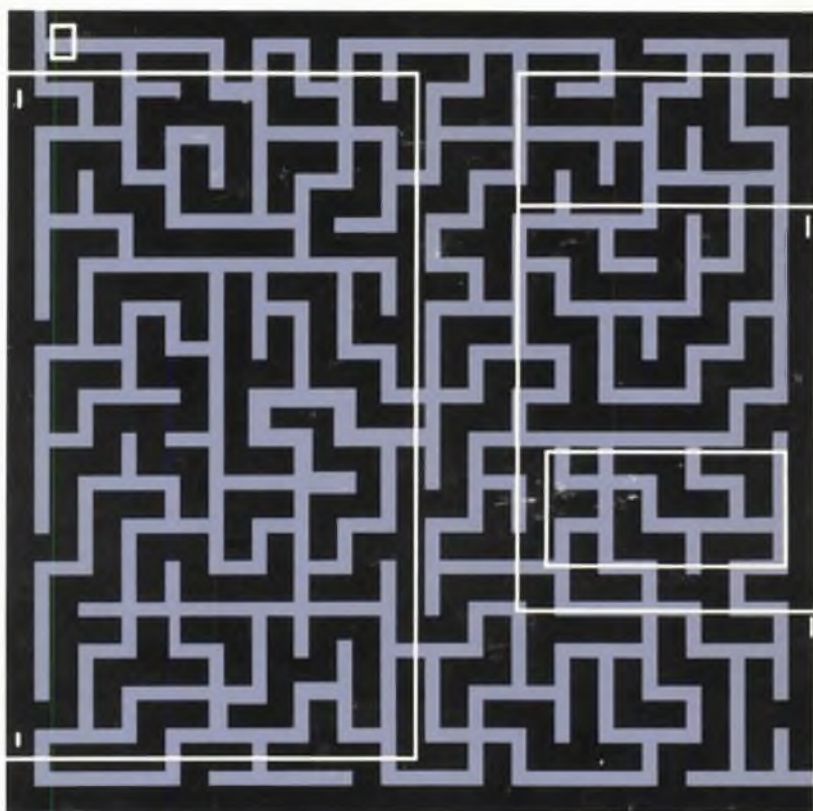


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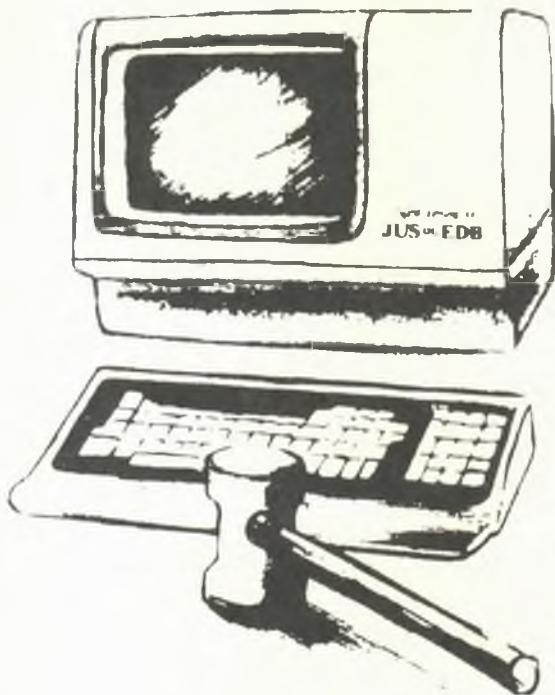
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To Ina

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Introduction

In this thesis two issues are in focus, first the *concept* of a norm as presented in the theory of Sundby, second the issue of *formalization* of norms. Through the discussion of these two issues I have tried to clarify certain questions about, on the one hand, the relation between studies in deontic logic and more informal studies in legal philosophy, and, on the other hand, the relation between studies in deontic logic and works on the representation of norms in logic programming.

Part one - The concept of a norm

In part one of the thesis I present parts of a discussion of the concept of a norm. My original motivation for engaging in this study was a wish to understand the relation between works on deontic logic and more informal studies in legal philosophy. These studies appeared to me to be the works of two different schools of philosophy, with little contact between them. I now believe this to be an incorrect picture, as these studies have a lot in common and mutually benefit from each other.

Still the picture is correct when it comes to how these studies have been conducted in Norway. I have therefore devoted half of this thesis to a thorough discussion of the theory of norms presented by the Norwegian legal philosopher Nils Kristian Sundby in his thesis¹ **Om Normer** (eng. **On Norms**). My aim is to pave the way for a theory of norms that is amenable to further formal analysis through the construction of deontic logics. My claim is that many of the obstacles and complications to such a formal analysis presented in Sundby's thesis are unnecessary.

In the theory of norms presented by Sundby we get a presentation of the concept of a norm that seemingly creates severe difficulties for any further formal analysis. Sundby strongly criticises earlier attempts at analysing the concept of a norm by the construction of deontic logics for not taking seriously the problems presented by his analysis. Through his analysis of normative intensions, he wants to establish that normative intensions may not be given a semantical evaluation in terms of truth and falsity. Further he wants to establish a distinction between directive normative intensions and

¹ Sundby 1974

qualificatory normative intensions as different modalities, not reducible to each other. Later he also introduces what he sees as a logical distinction between intensions expressing rules and intensions expressing principles (or guidelines). All of this poses problems for further logical analysis.

In chapter 1. I discuss Sundby's analysis of normative intensions. In the discussion of Sundby I have found that this analysis is somewhat loose. His taxonomy of communicative acts is not as thoroughly constructed as the taxonomy made by Searle.

In chapter 2. I address the point that the theories of communication of Austin, Searle and Sundby all lack a proper analysis of what makes the transmission of information by means of communicative acts possible. In the theory of communication designed by Andrew Jones, I have found an alternative account to that of Sundby. This theory completes the analysis of how transmission of information is possible. Further Jones use a different set of arguments regarding how to analyse normative intensions. Jones specifies, for instance, the constituents of a normative communicative act by giving a set of truth-conditions.

In chapter 3. I argue that Sundby's hesitation to use the values true and false in the semantical evaluation of normative intensions is based on several misconception about semantical evaluation. When these misconceptions are put aside we should not hesitate to analyse norms and normative intensions by giving truth-conditions for these concepts.

In chapter 4. I argue that the distinction between directive and qualificatory modalities is superfluous. Qualifications are just definitions, the logical representation of which exhibits no special normative modality. The representation of qualifications does not therefore pose any problems for the *deontic-logical* representation of norms.

Further, I argue that the distinction between rules and principles is based on a misconception of the problem of "open texture" in natural language expressions. The representational problem for future deontic logics is not to represent a distinction between rules and principles, but to enable a kind of default reasoning made necessary by the "open texture" of expressions of norms in natural language.

Finally, in chapter 5. I discuss Sundby's concept of a norm. Sundby wishes to maintain that there are two separate ways of creating a norm. First and foremost, a norm is created

through *internalisation* of a normative intension; second a norm is created by *enactment*. Sundby sees an inner urge to comply, a sense of duty, as constitutive of the concept of a norm. This urge comes as a result of the process of internalisation. But, enacted norms are not necessarily internalised; internalisation of enacted norms is only a *possibility* created by our internalisation of norms of competence. It is difficult to see how Sundby can maintain that enacted norms really are norms if they lack the defining quality of creating an urge to comply.

I present an alternative account to Sundby due to Ingmar Pörn and Jones. Here the focus is on enactment. We do not require the presence of any urge to comply. The relation between the norm and a person's intention to comply is explained as being created by a want in the person to achieve some state of affairs by complying with the norm. This view demands a further analysis of the process of enactment. I call for further analysis of the concept of having competence.

Through chapters 1. to 5. I have pointed to several problematic aspects of Sundby's analysis of the concept of a norm. If there is to be a conclusion, this must be that much of Sundby's criticism of the more formal, logical analysis of the concept of a norm is unwarranted. Even if we still lack a proper analysis of the concept of competence, there are several reasons to prefer the analysis of the concept of a norm presented by Pörn, and the analysis of normative communicative acts presented by Jones.

This first part of the thesis is to a large extent a comparison between existing theories. I do not claim that much of what I have to say is new. Most of my arguments are to be found in other sources. What is new is my use of these arguments in a discussion of Sundby. As Sundby himself echoes many other legal philosophers, I believe this discussion to be of interest also to non-Norwegian readers.

Part two - Formalization of norms

In part two of the thesis I discuss certain issues concerning the formalization of norms. My original motivation was to understand why so few works within the field of Artificial Intelligence and Law take notice of the philosophical works on deontic logic. First of all there are many works that avoid representing the deontic aspects of law entirely. But there are also examples that address the representation of deontic concepts, but without taking into account the distinctions expressed in earlier works on deontic logic. One such example is a paper by Marek Sergot² suggesting a purely extensional representation of deontic concepts.

In chapter 6. I discuss the concept of formalization in general. I raise the question of whether there are differences in the criteria for deciding what is an appropriate formalization between philosophical works on the design of logical systems and practical work on designing computer programs. I have found that the logic programming group at Imperial College, London, emphasises two criteria that are foreign to philosophical works. The first criterion is that there should be a close resemblance between the formalization and the original text; the second criterion is that the formalization must have a direct practical utility.

In chapter 7. I give an exposition of the so called "Chisholm paradox", and of several attempts to solve the paradox by constructing systems of deontic logic. Through this account I illustrate important distinctions expressed in earlier systems of deontic logic, such as the distinction between *prima facie* and *actual* obligations. This account may also be seen as an exposition of various ways to analyse the deontic modality **Shall** referred to in the first part of the thesis.

Finally, in chapter 8. I discuss Sergot's proposal to use a purely extensional representation of deontic concepts. First I present the logic program proposed and address some points about the correctness of the representation. Then I discuss the representation in relation to Chisholm's paradox. I find the representation creates a problem of logical dependence. Finally I argue that a stronger version of Chisholm's paradox exposes even more clearly the need for representing a distinction between

prima facie and actual obligations.

All in all I think I have traced the reason why so few works in Artificial Intelligence and Law pay attention to works in deontic logic. The concern about the practical utility of the program has led the programmers to argue that the complexities of deontic logic are unnecessary in regard to the practical demands they wish to meet. But, there may also be a practical demand for a formalization of genuine deontic reasoning. I have shown that in certain situations the use of deontic reasoning calls for a representation of distinctions that are central in deontic logic, especially the distinction between prima facie and actual obligations.



Part one - the concept of a norm

1. Normative intensions

Sundby begins his analysis of the concept of a norm by distinguishing between different types of communicative acts expressing different types of *intensions*. The word "intension" here denotes the meaning content expressed in a communicative act. As Sundby hesitates to say that this meaning content is given a normal semantical evaluation in terms of truth-conditions, I prefer to speak of an "intension" instead of the more common concept of a "proposition".

Sundby tries to define different types of normative intensions, which, so to speak, are the material of which norms are made. In making these distinctions he refers to the work of J.L. Austin and J.R. Searle as if they were the originators of the distinctions he makes. This is not very accurate. First, because Searle in his theory made great changes to the theory of Austin. Second, because Sundby's own distinctions match neither Austin's nor Searle's. In order to put things straight I will give a brief description of Austin and Searle's theories in sections 1.1 and 1.2 and then present Sundby's theory in section 1.3.

1.1 Austin - locutionary and illocutionary acts

J.L. Austin started his attempt to describe what are the specific features of different types of communicative acts by making a distinction between "utterances which are sayings and utterances which are doings"³. For utterances *describing* how things stand he chose the name "constatives", for utterances that are *acts*, such as promises or bets, he chose the name "performatives". But in the course of **How to do Things with Words** Austin came to the conclusion that making a statement or giving a description is just as much performing an act as making a promise or a bet. Austin therefore left the distinction between constatives and performatives in favour of a distinction between

³ This formulation is due to Searles description of Austins work though. Searle 1973:p 142.

*locutionary acts and illocutionary acts.*⁴

Austin subdivided the locutionary act in;

- a) the *phonetic act* of uttering certain sounds or making certain signs,
- b) the *phatic act* of making these sound or signs in conformity to certain conventions that allow us to recognise these sound or signs as certain words in a language or system of signs,
- c) the *rhetic act* of using these words with a more or less definite sense and reference.

As an example, a situation may be conceived in which a speaker **a** utters the sentence "Peter has a gun" to an audience **b**. In order to do this **a** has to a) utter certain noises; b) make these noises recognisable as certain words. Furthermore, c), if **a** intends to inform **b**, and not only to babble words without meaning, then **a** must intend the words to have a certain reference. For Austin the combination of these acts constitutes a locutionary act.

What constitutes the illocutionary act may be seen as an answer to the question of what **a** *does* by uttering the sentence "Peter has a gun". Does **a** just describe this to **b** as a matter of fact, or does he try to warn **b**, or to threaten **b**, or with the right intonation maybe to ask **b** if this is the case? Such words as *describe, warn, threaten, ask* mark different *illocutionary acts*. They indicate different ways in which **a** may use his utterance.

Searle criticises Austin's analysis by pointing to the fact that, when illocutionary verbs are used in a sentence, e.g. "I *warn* you that Peter has a gun", it is impossible to distinguish a description of the locutionary act and a description of the illocutionary act.⁵ Every time Austin describes a rhetic act he describes it as an illocutionary act, and there is indeed no other way to describe the rhetic act. Searle concludes that the distinction between locutionary and illocutionary acts seems to dissolve, and he tries to develop his own theory in order to preserve what he sees as the most important intuition behind Austin's distinction. Searle writes: "...Austin may have had in mind the distinction between the content or, as some philosophers call it, the proposition, in an illocutionary act and the force or

⁴ I have left out the third part of Austins tricotomy, "the perlocutionary acts" as this concept never play an important role in the further presentation.

⁵ Searle 1973:n 143

illocutionary type of the act.”⁶ Searle calls the act of uttering a proposition the “propositional act”. The propositional act replace Austin’s notion of a rhetic act. We now have a distinction between a *phonetic* act, a *phatic* act⁷, a *propositional* act, and an *illocutionary* act.

A part of the reason for making these distinctions is that we want to classify different types of communicative acts. Austin thought he could do this by distinguishing different types of illocutionary acts. Austin tried to make a classification on the basis of lists of different illocutionary verbs. Again Searle gives us a devastating criticism by pointing out that Austin’s classification shows no sign of being built on any consistent principle or set of principles, the result being a large amount of overlapping between the categories, large differences within the categories, and verbs that seems to have been placed in the wrong category.

1.2 Searle - a taxonomy of illocutionary acts

Again Searle shows himself as a true heir to Austin’s philosophy by creating a new classification of illocutionary acts based on what he sees as twelve systematic criteria for determining the *force* of an utterance⁸.

I shall list here only those criteria which are most relevant to my present purposes. These are:

- 1) *Differences in the point (or purpose) of the (type of) act.*
- 2) *Differences in the direction of fit between words and the world.* Searle uses a story told by Elisabeth Anscombe to illustrate this point. She tells of a man who goes to the supermarket with a shopping list given him by his wife. While he picks the goods indicated on the list he is followed by a detective who writes down everything the man takes. When the man is finished, the detective’s list and the shopping list should be identical. But the purposes of the lists are different. The purpose of the shopping list is to get the world to fit the words, while the

⁶ Searle 1973:p 154.

⁷ In “Speech Acts” phonetic and phatic acts are combined in the notion of an *utterance act*, Searle 1969:p 24.

⁸ Searle 1979:Ch. 1.

purpose of the detective's list is that the words fit the world.

3) *Differences in expressed psychological states.* I think it is sufficient to indicate what is meant by saying that making a statement expresses a *belief* on behalf of the speaker; making a promise expresses an *intention* on behalf of the speaker; making a request express a *wish* on behalf of the speaker.

4) *Differences in the force or strength with which the illocutionary point is presented.* For instance there is a difference between *suggesting* something and *insisting* on something.

5) *Differences in the status or position of the speaker and hearer as these bear on the illocutionary force of the utterance.* What the general asks the soldier to do will more easily be understood as an order to do it than in the situation where the soldier asks the general to do something.

8) *Differences in propositional content that are determined by illocutionary force indication devices.* For instance a prediction must be about the *future* and a report must be about the *past*.

10) *Differences between those acts that require extra-linguistic institutions for their performance and those which do not.* Acts of baptising, excommunicating or making legal judgments typically require extra-linguistic institutions, while making a description does not.

On these criteria Searle builds his taxonomy of illocutionary acts which gives us a classification of types of communicative acts (or speech acts). I will summarise the whole taxonomy:

Assertives. 1) The point (or purpose) is to commit the speaker to the *truth* of the expressed proposition. Searle maintains that assertives, as opposed to other illocutionary acts, may be assessed as being true or false. This point will be discussed in the next chapter. 2) The direction of fit is words to the world, i.e. the words must fit the world. 3) The psychological state expressed is belief.

4) Different kinds of assertives could be discerned in terms of differences of strength of the illocutionary point. This probably holds for all kinds of speech acts, but neither Searle nor I feel the need to discern different subclasses of the classes that

are being listed here.

Directives. 1) The point consists in the speaker's attempt to get the hearer to do something.

2) The direction of fit is world to words, i.e. the world is supposed to be made to fit the words. 3) The psychological state expressed is want (or wish or desire). 8) The propositional content is always that the hearer does some future action.

Commissives. 1) The point is to commit the speaker (in varying degrees) to some future course of action. 2) The direction of fit is again world to words. 3) The psychological state expressed is intention. 8) The propositional content is always that the speaker does some future action.

Expressives. 1) The point is to express a psychological state specified in 3) about a state of affairs specified in the propositional content. 2) There is no direction of fit.

Declarations. 1) The point is to bring about a correspondence between the propositional content and reality. Searle writes: "Declarations bring about some alteration in the status or condition of the referred to object or objects solely in virtue of the fact that the declaration has been successfully performed"⁹ An example is the utterance of the sentence "May I introduce you to Miss Marple"; the uttering of such a sentence is itself enough to introduce two people to each other; their social relation has been altered. In this Searle finds an echo of Austin's original features for defining the class of performatives. (As we will see, a similar view has been presented by Searles 1965.)

2) Searle wants to maintain that the direction of fit is both from the words to world and from world to words. 3) No psychological state is expressed. 10) All declarations, except declarations concerning the language itself,¹⁰ require extra-linguistic institutions.

An important point expressed by Searle, is that his

⁹ Searle 1979:p 17.

¹⁰ Searle also mentions supernatural declarations like God saying "Let there be light", but I feel this may be safely ignored.

taxonomy of speech acts shows that there are finitely many ways to use language. A number of people have held that there is an infinite or indefinite number of uses of language. Searle maintains that such an illusion has been engendered by the lack of clarity about how the distinctions between different uses (or between different *language games*) should be characterised. He writes: "If we adopt illocutionary point as the basic notion on which to classify uses of language, then there are a rather limited number of basic things we do with language: we tell people how things are, we try to get them to do things, we commit ourselves to doing things, we express our feelings and attitudes and we bring about changes through our utterances. Often, we do more than one of these at once in the same utterance."¹¹

1.3 Sundby's taxonomy

Sundby arrived at a taxonomy of speech acts very similar to Searle's. Sundby creates the notion "ytrings-handling", and he writes in parenthesis, by way of explanation, "(locutionary act, utterance act)".¹² But, as Sundby defines this act, it is only a parallel to Searle's notion of an utterance act, the combination of a phonetic and a phatic act. Sundby further creates the notion "språkhandling" (eng. "linguistic act") which is, he writes explicitly, a translation of Austin's notion of an illocutionary act. But, for Sundby the act of expressing a proposition is part of the linguistic act. This is not the case in either Austin's nor Searle's analysis. I must admit that I found Sundby's presentation confusing, and it took me a great deal of work to disentangle it. The differences between Austin, Searle and Sundby are illustrated by the following diagram:

¹¹ Searle 1979:p 29.

¹² Sundby 1974:p 25.

Austin	Locutionary act	Making signs and sounds (Phonetic act) Making words with signs/sounds (Phatic act) Attributing sense & reference to words (Rhetic act)
	Illocutionary act	Expressing a certain mood
Searle	Utterance act	Making signs and sounds (Phonetic act) Making words with signs/sounds (Phatic act)
	Propositional act	Expressing a proposition
	Illocutionary act	Expressing a certain mood
Sundby	Ytringshandling (Utterance act)	Making signs and sounds (Phonetic act) (Implicit: Making words with signs/sounds (Phatic act)
	Språkhandling (Linguistic act)	Expressing a certain mood Expressing a proposition

Sundby also makes these distinctions in order to create a taxonomy of different speech acts. But Sundby's interest in such a taxonomy was different from that of Searle; it was to establish a basis for further exploration of what he saw as the two basic types of norms, "directive norms" and "qualificatory norms". Searle's definition of assertives corresponds to Sundby's definition of "indikativer" (eng. "indicatives"); Searle's directives correspond closely to Sundby's "direktiver", and Searle's declaratives correspond closely to Sundby's "kvalifiseringer" (eng. "qualifications"). But Sundby doesn't choose to build his taxonomy on systematic criteria in the same way as Searle. He uses the equivalent of Searle's second criterion about differences in the direction of fit between the words and the world to

distinguish between indicatives and non-indicatives. But he has no clear distinctions for classes of non-indicative speech acts other than directives and declaratives. This is also illustrated by the missing bar in Sundby's own diagram:

Indicatives	Non-indicatives		
	Normatives	Other	
	Directives Heteronomous Autonomous (commis-sives)	Qualifications	By example: Expressives, Evaluations

Sundby 1974: p 38.

Sundby doesn't even keep to the defining criteria he has introduced when defining directives and declaratives. He writes that he will use the illocutionary point to distinguish classes of speech acts,¹³ but when he then defines the class of directives he uses as a defining criterion that the propositional content is restricted to actions¹⁴. A possible reply is that Searle also restricts the propositional content to actions, but Searle has in advance defined a criterion (8) that says that illocutionary force indicating devices may determine the propositional content.

What is clear from Sundby's presentation is that he maintains that there are two different types of illocutionary acts giving two different types of normative intensions, a *directive* intension and a *qualificatory* intension. The distinction between these two normative intensions is the basis for the later distinction

¹³ Sundby 1974:p 29-30, "På basis av karakteren i menings-innholdet kan vi skille mellom ulike klasser av språkhandlinger, og derved mellom ulike typer av utsagn..."

¹⁴ Sundby 1974:p 50, "Det som særpreger alle direktiver er skal-karakteren og et saksinnhold som referer til handlinger." I was directed to this fact by Malt (Univ. of Oslo).

between *directive* and *qualificatory* norms. At some points Sundby's presentation suffers from being too vague. The only thing he has to say about the semantical values these normative intensions are to be assigned, is that, in contrast to indicatives, they are not *true* and *false*. I will discuss the issue of semantical values in chapter 3. The only thing Sundby says about the difference in modality between directive and qualificatory intensions is that directives have a modality expressing that something **shall** be the case, while qualifications have a modality expressing that something **X shall count as Y**. I will discuss the modality of qualifications in chapter 4. A discussion of the modality **shall** is given, somewhat indirectly, through the presentation of different deontic logics in chapter 7.



2. How communicative acts are constituted

What is lacking in all the theories of communication presented by Austin, Searle and Sundby, is a well founded theory of how it is possible to communicate all the information that they claim is transmitted in a communicative act. In the following chapter I will fill in this rather important part of the theory by presenting another cluster of theories about communication and meaning. Through the presentation of Jones' theory of communication an alternative account to Sundby's account of normative intensions is presented. Jones' account plays a central role in the further discussion of the concept of a norm.

2.1 Stenius - mood and language game

Searle's taxonomy illustrates how a speech act transmits a lot more information than merely the information about the propositional content. The taxonomy gives us a clue as to what information it is that makes us able to distinguish between different language games, or different uses of language. But, neither Austin, Searle nor Sundby has said anything about what constitutes a speech act in the sense of what makes it possible to transmit all this information. What are the constitutive rules of language use? I will start with a presentation of the views presented by Erik Stenius in "Mood and Language-Game"¹⁵.

Stenius gives a description of two simple language games: The first game is a *report-game*. We are asked to imagine a gardener, who teaches his assistant to write on a piece of paper a lower-case letter for each flower-bed and, beside the lower-case letter, the capital letter P if the plants are in flower or the letter Q if the plants are not in flower. For this game to function the assistant must follow an underlying semantical rule saying: Only if the plants are in flower will he write P, and only if the plants are not in flower will he write Q. The game will only function if the assistant follows a rule of truthfulness, and the gardener trusts that the assistant follows such a rule. But, even if the assistant breaks the rule, the signs will still be sentences of the agreed language, although they will not function effectively if the gardener loses his confidence in the assistant's truthfulness. The

¹⁵ Stenius 1967.

rule therefore seems to be only a preservative rule and not a constitutive rule.

Stenius describes a *command-game* as well. This time it is the gardener who writes a lower-case letter for each flower bed. The gardener now writes a capital letter P to say that the assistant has to plant new plants being in flower in the flower-bed denoted by the lower-case letter, and he writes a capital letter Q to say that the assistant has to plant a plant that is not in flower. This time the semantic rule is that the assistant must create the circumstances indicated on the paper; he must bring about the truth of the proposition.

Now, if the gardener and the assistant sometimes switch their roles in the game, they will have to indicate which of the games is being played. They will need to indicate which of the semantic rules they intend to use in their communication. An indication of which semantical rule is followed is what the illocutionary act contributes to the meaning of the utterance. But, what is the character of these semantical rules when we are not talking about a simplified game with an explicit agreement about the rules, but talk about semantical rules used in ordinary communication?

2.2 Lewis - conventions

David Lewis discusses this question in an analysis of language and signalling systems which in many ways takes the ideas of Stenius a step further.¹⁶ The games played by the gardener and the assistant are in terms of Lewis' terminology signalling systems in which the gardener and the assistant coordinate their plans for different action-alternatives. If these coordinated action-alternatives are being used on a regular basis, we would say that a *convention* has been established. The signalling system has turned into a *conventional* signalling system. We may then say that what the signals indicate is the *conventional meaning* of the signal. Following Stenius, Lewis maintains that the truth-conditions of a signal of the command type are met by doing what the signal indicates. Commands are

¹⁶ David Lewis "Conventions" 1969.

made true by being satisfied.¹⁷

Lewis is proposing that the analysis of a conventional signalling system may be expanded to an analysis of possible (and actual) languages without any basic changes in the theory of use. In this he follows the strategy devised by Montague in enriching the signalling system to give all the expressive power of a natural language. It is not possible to signify in advance all the definite situations that satisfy the truth of each sentence of a language. Lewis therefore suggests that truth-conditions be given by determining a set of *possible worlds* where the truth of the sentence is satisfied.

We now see how Lewis by this analysis is able to distinguish between the meaning of a sentence (or expression) and how the sentence is used. Lewis is able to talk about *possible languages* where the meaning of the sentences may be fully specified in terms of truth-conditions relative to a set of possible worlds. He then goes on to specify the conditions under which we would say that a language is the actual language *used* by a population.

I will present the revised 1975 version: "A language $\mathbf{\mathfrak{L}}$ is used by a population $\mathbf{p}$ if and only if there prevails in $\mathbf{p}$ a convention of truthfulness and trust in $\mathbf{\mathfrak{L}}$, sustained by an interest in communication."¹⁸ Lewis maintains that the population follows this convention because the members of the population have a mutual interest in being able to communicate; i.e. they have a mutual interest in taking advantage of, and preserving, their ability to exert control over other people's actions and beliefs by the help of certain noises and signs. As I said, much of this sounds quite like Stenius' proposals. Lewis writes explicitly that: "I have adapted his (Stenius') proposal by building truth conditions into the identification of possible languages and by taking his rules of truthfulness as conventions of truthfulness."¹⁹

¹⁷ About satisfaction as semantical evaluation, see section 3.5.

¹⁸ Lewis 1975:p 10.

¹⁹ Lewis 1969:p 177.

2.3 Jones - rules of information

Jones has criticised Lewis' characterisation of language use.²⁰ His argument brings forth the criticism made against Stenius' semantical rules, that they were *preservative* and not *constitutive*. Lewis' definition is even more prone to such a criticism because his definition of the use of a language calls upon a notion of *convention* which implies the existence of a regularity. We lack a formulation that says what constitutes language use. In addition Lewis' definition is quite rigid in the sense that it demands truthfulness and trust from all the language users. This makes it difficult to explain language uses like joking, irony, metaphorical speech, fiction etc.

Jones accepts as a basic distinction Lewis' distinction between *meaning*, described in terms of an abstract semantic system, and *use*, described in terms of constitutive communicative rules. Jones has found a different way to characterise these underlying semantic rules. His basic perspective is to see human communication more as types of information-processing than as types of games. By focusing on the apparently obvious fact that all communication implies transfer of information, Jones has given a fresh view on human communication and how to analyse communicative situations.

2.4 Sign systems

Jones' analysis starts with a description of how a person *s* may use a sign to keep himself informed. Such a situation may perhaps not exhibit the complexity of inter-personal communication situations. Anything may be a sign for *s*, also an action by some person *a* other than *s* may be understood as a sign by *s*. There may be no one else but *s* that perceives the sign as a sign.²¹

To avoid introducing yet another story, I will develop Stenius' story about the gardener and the assistant to illustrate

²⁰ Jones 1981:p 96-99.

²¹ We shall symbolise the persons as *s* and *a* because we want the symbols to be as uniform as possible through the exposition and, as the theory develops, it will become reasonable to interpret these symbols as *speaker* and *audience*.

Jones' approach. Imagine that the gardener notices that the assistant starts to change his clothes precisely at 4.00 p.m. when the working hours are ended. When, later, the gardener's clock stops functioning he doesn't care to repair it. He only needs to know when the working hours are over. He believes that when the assistant starts changing, and the general circumstances are that it must be some time since the lunch break, then the assistant's changing of clothes is a *sign* that the time is 4.00 p.m.

Generally we may say that: *a* believes that if *s* does *p*, and it is the case that *Z*, then it is the case that *q*. Jones makes a complete symbolisation of this statement, writing "*a* believes that" as B_a and "*s* does *p*" as $E_s p$, which gives us the sentence²²

$$(1) \quad B_a((E_s p \ \& \ Z) \rightarrow q)$$

If *a* has other beliefs of this type, then we may refer to the set of such beliefs as *a*'s *sign system*. By giving truth-conditions for $(E_s p \ \& \ Z)$ in *a*'s various beliefs, we may describe the sign system of *s* as an abstract semantic system. And we may express the idea that this abstract semantic system is *used* by *s* as a sign system by saying that *s* has a set of beliefs of type (1) which he employs for the purpose of informing himself.

2.5 Indicative signalling systems

Jones is able to enrich the analysis of a sign system into an analysis of a signalling system. To illustrate his point, I must develop the story about the gardener and the assistant a bit further. Let us imagine that the assistant becomes aware that his boss, the gardener, has started to use his changing of clothes as a sign that the working hours are over. The assistant may consciously exploit the fact that his boss takes his changing of clothes as a sign by starting to change earlier to shorten his working hours. Next the gardener becomes aware of the assistant knowing about the gardeners sign system. If the

²² In Jones 1983 all symbolised sentences are given truth-conditions by way of a formal semantics for each of the symbolised notions; i.e. "belief", "action" and the notions added in the sentences given later.

gardener is to have reasonable grounds for maintaining his belief (1) there has to be a further mutual belief between them that the assistant's act of changing his clothes is optimal in the gardeners interest of being informed about that the working hours are over.

This mutual belief is not to be described in Lewis' fashion as a convention about truthfulness and trust between the gardener and the assistant. Jones' clue to how to overcome the problematic sides of Lewis' definition of the use of language is to describe this mutual belief as that the signal is "*optimal* with respect to the gardener's *interest in being reliably informed*".

If we may suppose that the gardener and the assistant share a mutual belief as described above, they have created a **signalling** system among themselves. We may generalise the description of a signalling system by saying that: the persons *s* and *a* share a mutual belief that, if *s* brings about *p* under the circumstances *Z*, and *s*'s bringing about *p* is optimal relative to *a*'s interest in being reliably informed, then *q* is the case.²³ This is symbolised:

$$(2) \quad B^*_{sa}((E_s p \ \& \ Z \ \& \ O_a E_s p) \rightarrow q)$$

where $B^*_{sa}p$ means "*s* and *a* mutually believe *p*" and $O_a p$ means "*p* is optimal relative to *a*'s interest in being reliably informed". Jones wants to call (2) "a rule of information".²⁴ (2) is a truly constitutive rule of an indicative (descriptive, reporting) signalling system.

2.6 Directive signalling systems

Jones finds a rule of information quite similar to rule (2) to be the underlying semantic rule of imperatives (which I here prefer to call *directives* in the manner of Searle). In describing a directive rule of information, Jones may possibly have been inspired by Lewis' proposal that all non-declaratives ought to be

²³ In the general formulation and in the following symbolisation I follow the latest version given in Jones 1990. Later symbolisations are adjusted to the 1990 version.

²⁴ Jones 1983:p 22f.

treated as paraphrases of the corresponding performatives.²⁵ If I say "Be late!" the performative paraphrase is "I command you to be late". Lewis classifies performatives as declaratives. If I say "Be late!" and you are not late, the embedded proposition is false, but the paraphrased performative is true because I *do* command that you be late. He finds that the reason why we have ignored the truth-conditions of performatives is because it is hard for a performative to be anything but true on an occasion of utterance. But it is possible for the performative to be false if I am not serious in uttering it.

What Lewis means needs some explanation. First of all, apparently Austin discarded the notion of performatives in favour of a distinction between locutionary and illocutionary acts. But the notion of performatives used by Lewis does not rely on the notion of performatives used by Austin.²⁶ The notion of performatives later used in Jones' treatment of this subject is explicitly said to rest on the analysis of performatives formulated by Searles 1965 and Lemmon 1962.

Alexander Searles' definition of performatives is close to Searle's definition of declarations. (Searle made his definition years later.) Searles discerns three different kinds of interpersonal relations: *psychological* relations of feelings and attitudes, *generative* relations of causing an action or state as a result or response in another person, and *formal* relations as present when the range of appropriate or permissible interaction between persons is determined by conventions or rules within a group. Formal relations may be altered simply by the performance of a speech act, as illustrated in the description of declarations, and Searles wants to reserve the notion of performatives to speech acts which alter formal relations. He observed that all of Austins first examples of performatives were of this kind. When Austin later included in the examples speech acts which altered generative relations as well, his notion of performatives became muddled and Austin gave it up.

Eric Lemmon, on the other side, noted that there were

²⁵ Lewis 1983:p 222-224.

²⁶ Alf Ross is seemingly ignorant of the fact that there are other notions of performatives than the one discarded by Austin, as Ross in the paper "The rise and fall of the doctrine of performatives" (1972) only repeats Austin's own arguments as reasons to discard the notion of performatives completely.

sentences that, when uttered in a special way and under special circumstances, seem to be verifiable by their use. Lewis' paraphrase of 'Be late!' may serve as an example. Lemmon found the notion of 'being verifiable by use' to be a more general notion than that of performatives. But Lemmon's notion is easily criticised. Jan S. Andersen cites O'Hair who says "it is analytic that there are circumstances (namely the existence of elephants in Africa) such that for all people, if, in those circumstances x utters the sentence 'There are elephants in Africa' then what he says is true"²⁷ To save Lemmon's definition of performatives from being trivial, more needs to be said about how to restrict the right circumstances. However I will abstain from this task, because I don't need a completely general notion of performatives but only Lemmon's intuition as expressed by Lewis of in what sense performative utterances may be said to be true or false.

Jones exploits Searles's notion of performatives to explain directives by stating that directives are performative in the sense that they alter inter-personal relations. What is altered is not a formal relation but a *normative* relation. He writes: "imperatives are descriptions of acts (performed by the source) of creating what may be described as a *normative relation* between the source and recipient. I shall say that an imperative signalling act which means that p is to be done, or an act of delivering a token of that sentence type, is *true* if and only if the source brings it about that it shall be the case that the recipient brings it about that p ."²⁸ This implies the view that normative as well as formal relations may be changed (or created) simply by making a speech act. And, in being performative in the sense described, directives are said to be verifiable by use.

In the light of what has been said what is indicated by a directive (imperative signalling act) may be described as E_S **Shall** $E_a q$; i.e. the speaker brings about that the audience shall bring about q , where **Shall** is an indicator of the existence of a normative relation. The underlying semantic rule for directives may be specified by simply expanding the consequent q of rule (2) to capture what is indicated by a directive. We get the following symbolisation:

²⁷ Andersen 1975:p 15.

²⁸ Jones 1983:n 89-90

$$(3) \quad B_{sa}^*((E_s p \ \& \ Z \ \& \ O_a E_s p) \rightarrow E_s \text{ Shall } E_a q)$$

In defining Searle's definition of performatives (and in Searle's definition of declaratives) the existence of extra-linguistic institutions plays a key part. We might ask what part extra-linguistic institutions play in Jones' definition of a semantic rule for directives. Jones maintains that for some directives, like requests, no extra-linguistic institutions seem to be involved. A request fails to be true only if the speaker is not serious in uttering the request. In case of more complicated directives, like orders, the truth-conditions seem to include the existence of extra-linguistic institutions like relations of power or authority. This implies that an order may be false both by not being uttered seriously and by lack of the required relation of power or authority. The existence of such extra-linguistic institutions may be specified in the truth-conditions by expanding the notion of the circumstances symbolised as *Z*.

2.7 Language use in general

We may generalise from the description of indicative and directive signalling systems to a description of the use of language or signalling systems in general. We will then be saying that *s* and *a* may be understood as any pair of members of a population *P*, and *E_ap* will stand for any act of producing a signal or sentence of the signalling system or language *L* adopted by *P*, and *q* will stand for the state of affairs signified by *E_ap*.

Jones writes: "Although the members of *P* should not be *required* to be truthful and trusting in their use of *L*, nor to believe that they are truthful and trusting, they should be required, as *L*-users, to have some opinion about standards which, ideally, performances of linguistic acts ought to meet."²⁹ The most general formulation of the constitutive rule for the use of a language is that: the population must share a mutual belief that what is optimal relative to their interest in being reliably informed is that all sentences/signals are *used* in a way that is optimal relative to their interest in being reliably informed. Which is symbolised:

²⁹ Jones 1981:p 104.

$$(4) \quad B_{sa}^* O_a((E_{sp} \ \& \ Z) \rightarrow O_a E_{sp})$$

which reads: *s* and *a* mutually believe that it is optimally in *a*'s interest in being reliably informed that, if *s* brings it about that *p* and the circumstances are *Z*, then it is optimal relative to *a*'s interest of being reliably informed that *s* brings it about that *p*.

Jones' formulation of these underlying semantic rules (rules of information (1), (2) and (3)) have many advantages in comparison with Stenius and Lewis' formulations. First and foremost in the sense that Jones' presentation allows us to make a distinction between *the meaning of a sentence* and what the speaker *meant* by uttering the sentence; i.e. what the speaker intends to achieve by uttering the sentence. We can make this distinction by discerning between a *literal* and a *non-literal* implementation of a rule like (2).

An illustration of a non-literal implementation of rule (2) would be a situation where a person entering a very hot room exclaims to an audience "It is cold here!" thereby intending to express just the opposite meaning 'It is hot here'. Jones characterises this situation with the following words: "*s* intends, as before, to get the audience to believe that he, *s*, is performing the speech act, but he intends to get the audience to believe that this performance is *not* non-deceiving; if he succeeds in bringing off these intended results, then he can reasonably expect the audience to wonder why he performed the speech act in the first place; and he can also expect that his audience's knowledge of the *meaning of the sentence* he uttered will play a part in directing them towards an understanding of what his *intended* effect was, because the topic of the sentence uttered pertains to the temperature at the place."³⁰ By pointing to different uses of the rule (2) we are able to characterise at least some forms of indirect speech, metaphorical speech, jokes and irony.

In addition Jones has given a more fitting characterisation, than Stenius and Lewis, of the modality in the semantic rules. Stenius uses an imperative modality³¹: "Produce a sentence in the indicative mood only if its sentence radical is true." and "React to a sentence in the imperative mood by making

³⁰ Jones 1981: p 105-106.

³¹ Stenius 1967:n 196

the sentence radical true." Lewis on the other hand, has chosen to describe these rules as *conventions* based on some actual regularity in behaviour. Jones' comment is: "However, since Lewis talks of conventions (regularities) where Stenius talks of rules, one might say that Lewis has chosen the wrong modality: one needs to refer not to what *will be* the case but to what *ought to be* the case in specifying the conditions characterising language use."³² I find that Jones' characterisation, using the special deontic modality 'Optimality relative to an interest in being reliably informed', gives a better intuitive understanding of how these underlying semantic rules are functioning.

2.8 Jones versus Sundby

In Jones' account of directives we have an alternative to the account made by Sundby. I prefer Jones' account for the following reasons: First, as described already, Jones includes an account of what conditions are constitutive of the communication of a directive. Second, Jones proposes a formal semantics for the concept **Shall** using standard deontic logic based on modal logic and possible worlds.³³ Third, Jones proposes a standard semantical evaluation in which a directive is either true or false, and he sketches what the truth-conditions of directives may look like. Jones provides a much better basis for further formal analysis of the concept of "a norm".

But in order to defend Jones' analysis, it must be argued that it is possible to use truth and falsity as semantical values for directives, and it must be shown how to deal with "qualifications" which Sundby maintains are normative intensions with a modality different from directives.

³² Jones 1981:p 107.

³³ In later works Jones has modified the analysis of **Shall**, I will have more to say about this analysis in the second part of this thesis.



3. Semantical values

In the following chapter I want to address the issue of what semantical values should be used in the semantic evaluation of normative intensions. Why this is an issue of concern is amply illustrated in the dilemma presented by Jørgen Jørgensen already in 1937.³⁴

3.1 Jørgens Jørgensen's dilemma

Jørgen Jørgensen presented what presumably is a dilemma for any attempt to determine the logical relation between directives or for any attempt at describing their semantics. From Aristotle and onwards logic has been seen as the method by which one may derive a true conclusion from a set of true premises. The relation of logical consequence is said to be truth-preserving. But Jørgensen maintained that no directive statement could be true or false, and this fact seems to preclude directives from being premises or conclusions in any logical argument. This dilemma faces everyone who wants to argue that there are logical relations between directives, and it must be dealt with if we wish to understand how to analyse the meaning of directives. That the dilemma is still a matter of discussion is indicated by recent papers by Alchourrón & Martino 1989 and Alchourrón & Bulygin 1989.

There are at least four possible ways out of the dilemma. First, one may deny the existence of any logical relations between directives. One may maintain that our intuitions concerning consistency are just psychological and void of any logical foundation. This has been claimed by Hedenius, Moritz and by the early Alf Ross.³⁵ The proponents of this solution will have to give a convincing argument showing that all attempts at designing deontic logics must fail. As I have not seen any such argument, I find this solution quite unsatisfactory.

Alchourrón & Martino 1989 propose a second way out of the dilemma. They make a purely syntactic deontic logic in which syntactic transformation rules substitute semantical evaluation. This syntactic approach may be valuable as an approach to designing automatic theorem provers for an existing deontic

³⁴ Jørgensen 1937/38

³⁵ According to Sandberg & Sundby 1971:p 40.

logic. But it is of course not a viable way of analysing the meaning of directives, or the logical relations between directives, as the design of syntactic transformation rules is just a new and more awkward way to express our semantic intuitions, since a logical model without any semantic evaluation is just a meaningless collection of symbols. Of course it is still an accepted method of analysis to use what is called "the syntactical method",³⁶ but it avoids making semantic considerations explicit.

A third solution to the dilemma is to maintain that the semantical values of directives are some other values than true or false, and to devise a theory of meaning and a logic to fit these values. I will discuss some attempts to do this. A fourth solution is to argue that Jørgensen was wrong in denying that directives can be true or false.

Before these last two solutions are discussed, we should look into the arguments as to why directives can't be true or false. Jørgensen doesn't himself give any arguments. He only appeals to our intuitions by stating³⁷: "Be quiet" - is it true or false? A meaningless question. Austin based much of his philosophy on the fact that only indicative utterances are true or false. But he doesn't give any argument either. He writes that he asserts this as obvious and therefore does not argue it.³⁸ In a similar fashion Sundby shrugs off the question by stating that any question about the truth or falsity of a directive is a *contradictio in adjecto*.³⁹ He admits that by saying this he has not proven anything. So it must be treated as a basic intuition.⁴⁰

³⁶ About the syntactical method, see section 6.1.

³⁷ Jørgensen 1937/38:p 289.

³⁸ The utterances cited are examples of performatives, but the same holds for directives. Austin 1962:p 6.

³⁹ Sundby 1974:p 170.

⁴⁰ I am inclined to say that philosophy starts by doubting what is taken to be obvious.

3.2 Direction of fit between words and the world

Searle does give an argument; at least an argument may be gathered from what he says about the distinctions between different types of speech acts. The argument gathered is this: An indicative describes something that is the case. By checking whether what is denoted by the indicative sentence really is the case, we can evaluate the truth or falsity of the sentence. Directives say that what is denoted by the sentence *shall* be the case. What is denoted is not yet there to be checked, and it is therefore impossible to evaluate the truth or falsity of the directive. In terms of Searle's terminology the illocutionary act of making a directive has a different direction of fit between the words and the world from the direction of fit of indicatives. In the indicative case one is concerned with whether the words fit the world. In the directive case one is concerned with whether the world *will* fit the words.

This argument is based on a misconception concerning what part of the communicative act is the basis for a semantic evaluation. As Searle sees it, we only evaluate what is expressed in the propositional act, i.e. the propositional content. But, a semantical evaluation must be an evaluation of the totality of the information conveyed in the communicative act. According to Jones a directive communicative act also conveys what he calls a description of an act of creating a normative relation between the source and recipient. As he sees directives as having the performative quality of immediately creating the relation described, we may assess immediately the information conveyed in the description. This brings out still another difference between Jones' and Sundby's accounts, as Sundby uses Searle's argument about a difference in direction of fit. Jones' account also puts in question the use of this difference as a basis for the taxonomy of different types of communicative acts.

The idea that non-indicatives *cannot* be true or false may possibly be traced back to Austin's idea that language has many other uses than simply to inform about what is the case. Jones maintains that to say, like Austin, that the essential function of indicatives is to inform people, while the function of directives is to get them to do things, is misleading. In a sense all communication is a process of informing, every communicative act is an act of transmitting information. Language and signalling

systems function only by transmitting information. Of course one who issues a directive ordinarily wants to make his audience do things, but the noises or signs produced in his communicative act don't themselves pull the audience by the arm. His directive simply imparts information to the audience about something, and the originator hopes that by imparting this information he will move his audience into action. We want to ask what information is imparted, and we want to ask whether the information is true or false.

3.3 The moralist fallacy

Knut Erik Tranøy⁴¹ maintains that to hold that a norm **n** exists is often taken to mean the same as '**n** is valid' which again is understood to entail that '**n** ought to be accepted by **x**' where **x** is any agent for whom **n** is valid. Tranøy adds that this understanding of what it means that **n** exists is what moral philosophers find interesting and challenging. My impression is that they become especially interested when the question is about the *objective* truth of normative statements, objective truth meaning absolute validity, which again is taken to mean that the norm **n** ought to be accepted by all persons at all times.

Sundby does not maintain that any norms have absolute validity. But as is seen from his choice of semantical values (see 3.5), he maintains that the existence of a norm entails a kind of inner urge to comply with the norm. To say that a norm **n** exists is for Sundby to say that the norm **n** is accepted by **x**; **x** accepts **n** as valid.

I prefer to distinguish between validity, considered as an issue of truth and logic - meaning 'truth in all models' - and the notion of validity, considered as an issue of acceptability, as it is used by Tranøy. The latter I prefer to call "moral validity" or "legal validity", depending on what kind of norms are being discussed. I will discuss how I understand this concept in chapter 5.

By maintaining that a directive may be true or false, we do not say anything about whether norms have any absolute validity. By maintaining that a directive may be true or false, we do not automatically assert anything about whether the directive

⁴¹ Tranøy 1988:n 51

ought to be accepted, nor whether it is accepted. What we maintain is that the information conveyed in the communicative act is true, i.e. that certain truth-conditions are met. We are free to specify these conditions. That the norm is accepted may be a condition, or it may not. This does not necessarily affect the question of what values to use.

3.4 The verificationist fallacy

Many authors seem to hold that we should not use the notions true and false in relation to directives because these notions require a *procedure* to verify that what is expressed by the utterance really obtains. As directives (and norm descriptions) express the existence of a norm, it is impossible (or at least very difficult) to verify the truth of what is expressed, because norms are such elusive objects. Sundby does not want even to evaluate indicative statements referring to norms as being either true or false because, as he says, this might lead us to believe that descriptions of norms have the same degree of objectivity as simple statements of facts.⁴² Alchóúrron and Martino have argued⁴³ against speaking of normative statements as true in a set of possible worlds by saying "perhaps we do not even know which tools are required for identifying these (ideal) worlds and the facts within them...". What they seem to require is an inter-subjective verification procedure.

The positivists and behaviourists, being the most extreme adherents of a view of this kind, actually maintained that all propositions that could not in principle be verified empirically should be regarded as cognitively meaningless. They made great efforts to create a scientific language purged of all non-verifiable propositions. Even if this effort was quite soon given up as impossible, the notion of a close link between truth and verifiability seems to have survived.

It is easy to see that we accept the truth of a multitude of facts without ever being able to actually verify them. Mental phenomena like specific beliefs or intentions are examples of facts whose existence we have no procedure to verify. Still we

⁴² Sundby 1974:p 174.

⁴³ This was referred to me by Henry Prakken, Vrije Universiteit Amsterdam.

like to talk about these facts as existing, and about sentences describing such facts as being true or false.

Within legal-philosophy H.L.A. Hart has argued against reducing jurisprudence to a study of the behaviour of judges, by pointing to how the rules of a game are constitutive of the game.⁴⁴ No rules, no game. We have to refer to the rules to be able to describe the game, even if such rules are completely abstract objects. Searle gives a similar example, showing that any description of a game of football with no reference to the rules and the intentions of the players becomes completely meaningless.⁴⁵ What we are left with are only statistical rules about the probability of periodical clustering of the persons on the field. It is impossible to infer from such an account of brute facts why this periodical clustering happens and what the game is about. So either we give up the notion of a verification procedure, or we give up the attempt to give a meaningful description in this case.

If we discard the notion of a verification procedure, we may as well talk about truth and falsity of norm descriptions and of directives. Difficulties in establishing the exact truth-conditions should not be taken to exclude the possibility of saying that directives may be true or false. We need to avoid a confusion of matters of *semantics* with matters of empirical *testing/checking*.

3.5 Other semantical values than truth and falsity

Stenius suggested that the meaning of a directive must be understood in the light of the semantical rule saying⁴⁶: 'React to a sentence in the imperative mood by making the sentence-radical true'. The question to be asked is whether the directive has been satisfied or obeyed. This implies that the semantical values of directives may be described as *satisfaction* values or *obedience* values. Jones indicates that a number of authors have adhered to this view, Lewis 1969 being one of them.

Jones criticises this view for leading to a disguised logic of act-description. As any directive is *satisfied* by the audience doing the action he is directed to do, the directive 'Do p' must, if

⁴⁴ Hart 1961:p 138-141.

⁴⁵ Searle 1969:p 50-53.

⁴⁶ Stenius 1967:p 196.

it is satisfied, logically entail the truth of p , which means that we must accept the formula ($\text{DO } p \rightarrow p$) as a valid formula. To accept this formula is to give up the possibility of expressing in our logic the modality of obligation, seen as a specific normative necessity. The difference between logical necessity and normative necessity turns in part on acceptance/rejection of the success condition. Acceptance of the satisfaction-value approach implies that the directives creating obligations are meaningless and empty if the obligation is not kept. These are reasons to reject satisfaction-values as the basis for a semantics of directives, and to reject the formula ($\text{DO } p \rightarrow p$) in our logic of directives. Furthermore in Stenius' semantical rule we may recognise Searle's argument about a different direction of fit (from indicatives). This argument I have already rejected.

Sandberg & Sundby 1971 suggest using the values "gjeldende/ikke-gjeldende", which might be translated as "holding/not-holding", to evaluate normative intensions. Their description of what is entailed by such a semantic evaluation is rather vague. The conditions for a directive to *hold* is that it is *experienced as being valid* (morally or legally), and that it *by and large is acted upon*. This discussion about semantical values is not continued in Sundby 1974, where Sundby only expresses the negative statement that normative intensions may not be true or false. But there are reasons to believe that he did not reject his earlier proposal of using the values holding/not-holding. As will become clear from chapter 5., he still held it to be constitutive of the concept of a norm that the existence of a norm creates an inner urge to comply with the norm. This reflects back on the evaluation of normative intensions; either they are experienced as valid and by and large acted upon, or they do not give a "true" expression of the underlying norm. I find this evaluation to be rather vague, and it will make semantic evaluation difficult.

Even more problematic than the vagueness in their description is their assumption that these values are not applicable to *all* normative intensions. They list certain normative intensions to which these values do not apply, but they don't suggest any additional values. What is suggested is a picture of a number of subtypes of general types of intensions, each requiring special values for the semantic evaluation. To make any formal model of how all these intensions interact will be hopelessly complicated.

Instead of taking a dogmatic stand on which semantical

values are appropriate, we may attempt to make abstract semantical models that fit our intuitions concerning the semantic properties of normative intensions. The model is abstract in the same sense as a mathematical model, of which we do not yet know whether it will have any application in the explanation of, for instance, physical phenomena. For reasons of economy of explanation we should start with as few semantical values as possible. We may be able to use the same semantical values for the evaluation of all normative intensions, as well as for the evaluation of indicatives, without getting a semantic model that violates our intuitions. If we manage, the burden of proof is shifted to those who deny the possibility of one set of semantical values for all these intensions to show why our model is wrong.

I find that work on deontic logic using the values true and false to evaluate normative intensions satisfies many of our intuitions concerning the logical properties of normative intensions. Where these logics do not satisfy our intuitions, it is not obvious that a change of semantic values will improve the logical model. Furthermore, when we no longer talk only of an abstract model, but of a model of some real world phenomena, I still find it natural to use true and false as semantical values as we are talking about an evaluation of information transmitted in a communicative act.

4. Normative modalities, rules and principles

The following chapter treats two seemingly unrelated topics. First, a discussion of the *modality* of qualifications. Second, a discussion of the distinction between *rules* and *guidelines*. What these two topics have in common is that, according to Sundby, earlier works on deontic logic are an insufficient basis for the discussion of norms in two important respects.⁴⁷ First, they do not take into account the logic of qualificatory norms. Second, they do not take into account a distinction between rules and principles (or guidelines). In this chapter I will discuss these two claims.

4.1 The modality of qualifications

In Standard Deontic Logic and most other deontic logics the concept **Shall** is defined as the basic modal concept. Other modal concepts such as **May** or **Forbidden** are defined relative to **Shall**, with the help of negation ($\sim$), in the following way:

Df.**May**: $\text{May } p =_{df} \sim \text{Shall} \sim p$

Df.**Forbidden**: $\text{Forbidden } p =_{df} \text{Shall} \sim p$

Other normative modal concepts as well may be defined on the basis of **Shall**.

In Sundby's taxonomy of communicative acts qualifications are considered as normative intensions distinguished by a separate modality described as "**X shall count as Y**" not reducible to the modality **Shall**.

My first suspicion concerning this category appeared when I saw that in Searle's taxonomy qualifications are not grouped with directives as being normative intensions. Searle maintains that directives and qualifications differ in the direction of fit between words and the world. As I have said earlier I find the whole argument about directions of fit to be based on a misconception (see 3.2). Therefore I can't rest an argument against Sundby on Searle's point, but rather on a discussion of the modality of qualifications.

⁴⁷ Sundby 1974:p 54.

The only type of qualificatory norms that Sundby discusses at great length are the so called "norms of competence". Initially he insists that these norms must be treated as exhibiting a special modality different from that of directive intensions.⁴⁸ But at the end of his exposition he writes that the purpose of insisting on a separate modality is to emphasise that norms of competence should be singled out for special attention. So much said he does not object to a reduction of norms of competence by rephrasing them in terms of directive norms!⁴⁹ Norms of competence, his key example of qualificatory norms, are in the end said to be directive norms of obedience, obliging the persons covered by the norm, on certain conditions, to obey the norms made by certain persons. Whether Sundby's analysis of norms of competence, and thereby of the concept of competence, is acceptable is a matter for later discussion.⁵⁰ Here it is sufficient to conclude that he has not given us a convincing example of why we should need a special type of qualificatory norms.

My suspicion concerning the proposal that qualifications are a type of normative intensions was further increased by the fact that the so called qualificatory norms, based on these normative intensions, behave rather strangely. Directive norms are often considered incomplete if there are no sanctions connected to transgressing them. Not so with qualificatory norms. If there are qualificatory norms qualifying something as a last will, you may achieve the act of making a last will by complying to the norms. If you don't comply, you are not punished, the only thing that happens is that you do not succeed in making a last will. What you write will not count as a last will. This fact is to Sundby a reason for seeing qualificatory norms as a type of norms separate from directives. It might also be seen as a reason to see qualifications as something other than norms.

I found a third reason for suspicion in the fact that much of the work on making legal expert systems conducted by the Logic Programming Group at Imperial College, London, is based on the assumption that they may avoid any explicit representation of any normative modalities, as long as their program only

⁴⁸ Sundby 1974:p 310-311.

⁴⁹ Sundby 1974:p 394.

⁵⁰ See my comments in section 5.3

includes legislative material that is "definitional in nature"⁵¹. This is exactly how we may understand qualifications, as being definitional in nature.

In defining the modality **Shall** we explicitly do *not* want to allow the schema:

Shall $p \rightarrow p$

This makes any sentence **Shall** p a much weaker statement than a definitional sentence like " p if and only if q ". In my opinion a qualification is a definition, and being a definition it is logically stronger than any normative intension. A directive is the statement of a regulative rule, while a qualification is the statement of a constitutive rule. Game rules are examples of rules that are definitional and not only regulative. If you transgress a game rule, you do not only transgress the regulative rule of not cheating the other players, you actually no longer play the same game.

Sundby did actually think that with the concept of a qualificatory norm he was able to link phenomena so diversified as mathematical definitions and rules defining a will. These phenomena were already linked by sharing the logical structure of a definition. In my opinion Sundby has not made any positive contribution by making definitions a normative concept. His criticism against deontic logic for not giving a treatment of qualificatory norms is therefore unwarranted. Definitional statements may be sufficiently represented, with the help of material equivalence.

4.2 Rules and principles

One third of Sundby's thesis is devoted to a discussion of a distinction between rules and "retningslinjer", which is best translated as "guidelines". It is a weakness in his exposition that this part is seemingly disconnected from the theoretical structure which he builds in the first part of the thesis. The distinction between rules and guidelines cuts across the earlier distinctions between directive and qualificatory norms. A close reading of

⁵¹ See for instance Sergot 1985:p 12-13, or Sergot 1987:p 30 last section.

Sundby shows that this distinction follows in great detail the distinction made by Ronald Dworkin between rules and "principles"⁵². Sundby dislikes the word "principles" because it has many connotations that he does not want to attribute to guidelines. But as his concept of a guideline is so close to Dworkin's much better known concept of a principle, I will use the word "principle" to cover both Sundby's and Dworkin's concepts.

Both Dworkin and Sundby insist that the distinction between rules and principles is a logical distinction⁵³. According to Sundby, rules have the logical form of a conditional⁵⁴, while principles are defined negatively as not being rules. Principles are not given any clear definition. Instead we have to piece together what the distinction between rules and principles consists in. I am indebted to Tina Smith (Univ. of Utrecht) for the following comparison, which also brings out the close similarity between Dworkin and Sundby:

1. Rules, but not principles, allow normative consequences to be drawn *deductively*.⁵⁵
2. Rules *determine* a solution to a normative problem, while principles only point out factors to be considered in the process of solving a normative problem.⁵⁶
3. Rules are applicable in an all-or-nothing fashion, while principles may be more or less relevant.⁵⁷
4. Conflict between rules is solved by giving one rule priority, while conflict between principles is solved by taking into account the relative weight of each principle.⁵⁸
5. In theory it is possible to make a complete list of all the exceptions to a rule and include them in a more complete statement of the rule, while the counter-instances to a principle

⁵² Sundby's refers to Ronald Dworkin's paper "Is Law a System of Rules" 1968.

⁵³ Dworkin 1968:p 37, Sundby 1974:p 198-199.

⁵⁴ Sundby 1974:p 197.

⁵⁵ Sundby 1974:p 199, Dworkin 1977:p 81.

⁵⁶ Sundby 1974:p 197-198, Dworkin 1968:p 37.

⁵⁷ Sundby 1974:p 273, Dworkin 1968:p 37 & p 39.

⁵⁸ Sundby 1974:p 274, Dworkin 1968:p 39-40.

are not even in theory subject to enumeration.⁵⁹

According to Smith, there is one point at which Sundby and Dworkin differ. Dworkin uses the concept of a principle to argue that in a legal conflict where there are no settled rules it will always be possible to find a legal principle providing one right answer.⁶⁰ While Sundby maintains that the legal method does not provide any such objectivity.⁶¹

What we get is a picture of a rule as a kind of discrete, sharp edged entity. Rules are provided in limited numbers. They give exact descriptions of when they are applicable. All the exceptions may be specified in advance. We know when the rule applies, and we know exactly the consequence, because the consequence is also specified, and it follows automatically when the rule applies. The rule determines the consequence, we may deduce what the consequence will be. When the rule applies, the only thing that may stop the consequence from following is that a conflicting rule with a higher priority applies to the same situation.

Principles, on the other hand, are a kind of fuzzy normative entity, filling the normative gaps between the rules. Principles are innumerable, often unwritten and adapted through custom. A principle just points out something to be considered; it does not determine a solution; nothing can be deduced from its existence. It may be more or less relevant, and carry more or less weight. It never creates a normative conflict, as it gives way to any other principle that is weightier for the issue at hand.

I do *not* agree that the distinction between rules and principles actually is a logical distinction between two types of norms. One way of explaining my point is this: Sundby writes that principles are introduced by the use of expressions in legal texts which he calls "avveiningsmarkører", which may be translated "assessment markers" or "assessment-flags". These expressions call for an assessment to be made, and the assessment introduces principles that function as more or less weighty arguments in the assessment. Examples of such expressions are "fair price", "decent", "suitable" etc. Sundby tries to discern different classes of such expressions within legal

⁵⁹ Sundby 1974:p 273, Dworkin 1968:p 37-38.

⁶⁰ Dworkin 1977:p 81.

⁶¹ Sundby 1974:p 261.

texts. Malt has pointed out a problem in identifying expressions as assessment markers.⁶² It is not clear from Sundby's presentation whether there are certain words that introduce assessments or whether there are complex expressions or whole sentences that introduce assessments. Furthermore no general criteria are given that enable us to distinguish the class of assessment markers from words or expressions that are not assessment markers.

It appears to be a quite general problem with natural language that concepts are vague, that they exhibit what Hart has termed "open texture".⁶³ We know about a set of prototypical situations whether the concept is applicable or not, but there remain a lot of situations where we are uncertain. As legal texts are written in natural language, this problem also appears where the antecedent of a rule is stated. This fact makes it impossible to specify in advance all the exceptions to a rule; so it is wrong to say that rules apply in an all-or-nothing fashion, thus invalidating criteria 3. and 5. (above) for distinguishing between rules and principles. Furthermore, open texture turns almost all natural language expressions into assessment markers. The concept of "open texture" makes the concept of "assessment markers" superfluous.

To make formal representations of rules where the antecedent includes open-textured concepts, we need a formalism that allows us to make default inferences from what is stated in the antecedent to what is stated in the consequent. That is; we need a formalism that enables us to express "exception-allowing general statements". Such formalisms are now being developed, for instance by defining a default conditional.⁶⁴ Using such a formalism we may infer a normative conclusion even if there may be yet unknown exceptions that later will block the inference from being made. Only in the sense specified by the logic of such a default conditional (or similar default operator) is deduction from rules possible; only in this sense do rules determine a normative consequent. Apart from such a specification, and especially in the account of Sundby, it is quite unclear what is meant by the words "deduction" and "determine". This is a reason to doubt the validity of criteria 1. and 2. in distinguishing

⁶² In his lecture series spring 1989.

⁶³ Hart 1961:Ch VII.1.

⁶⁴ See for instance Delgrande 1988.

rules from principles.

Finally, it is difficult to find anything else than terminological difference between the idea that you give rules different priorities, while principles are weighed against each other. This amounts to a refusal to accept as valid criterion 4., which is now the last remaining criterion on which to base a distinction between rules and principles. All in all there appears to be no basis for a logical distinction between rules and principles. On the other hand there may be norms in the logical form of a rule, which express that some fact ought to be taken into consideration when a certain assessment is made. If this may be taken as an expression of a principle, principles may be distinguished by their content, not by having a special logical form. It appears that Sundby saw the widespread occurrence of principles in the law as a fundamental obstacle to the construction of formal models of the law. He took it for granted that the adherents of deontic logic were naive in their failure recognise this fact. He did point to a serious problem, but his perception of the problem was wrong. Open texture is a more general problem confronting formalization of knowledge in general. One attempt to deal with this problem is the design of default reasoning systems. To make deontic logics with default reasoning properties is still a challenge to designers of deontic logic. But there is no reason to see this as an insurmountable obstacle to the construction of formal models of the law.



5. The concept of a norm

So far I have only discussed the basis for Sundby's theory of the concept of a norm, his theory of normative intensions. In this chapter I will address how the concept of a norm is further constructed on this basis. I also give an alternative view on the concept of a norm through the presentation of the work of Pörn and Jones.

5.1 Sundby's concept of a norm

Sundby writes that he perceives the concept of a norm as a relational concept.⁶⁵ The relation is specified by saying that some *x* is a *norm for* some person *y*. The *x*'s are the various normative intensions discussed earlier. To appear in the relation of being *norm for* some person *y*, the normative intension must become *connected* to the person. According to Sundby this connection is established either by the normative intension being *internalised* by the person, or by the normative intension going through a process of being *enacted* as a norm.

Sundby held the process of internalisation to be the foundation of the relation of being-a-norm-for-a-person. Again, Sundby does not venture to give a clear cut definition of the concept of internalisation. He refers to the use of concepts like "identification", "socialisation", "enculturation", "dispositions to act" etc. in psychological and sociological literature. He explicitly writes that internalised normative intensions are a lot like beliefs.⁶⁶ He does not want to identify these two concepts, possibly because he is not satisfied with saying that a person believes in the truth of a normative intension. He maintains that internalisation also involves an urge to act in accordance with this normative intension. The person may regard the normative intension as "bad", but might still regard himself as "bound" to respect it. Sundby describes the norm as fighting competing temptations.⁶⁷ He writes that we should not reject the fact that people experience "a sense of duty", and he disclaims that such

⁶⁵ Sundby 1974:p 119.

⁶⁶ Sundby 1974:p 124.

⁶⁷ Sundby 1974:p 127.

reactions of the "conscience" are indications of norms of absolute moral or legal validity, or messages from God.⁶⁸

To me this suggests a classical picture of a fight between the temptations and the voice of the conscience. There is a feeling of a sense of duty that binds the person to do certain actions. Though God or nature is not held responsible for these phenomena, it is this feeling of duty that to Sundby is the connection that relates a normative intension to a person. The feeling of duty is constitutive in his definition of a norm. He agrees that it is difficult to give empirical evidence for the existence of such a feeling of being obliged to act in certain ways. Still it has to show in a person's behaviour. At least we ought to find certain indications of the operation of a sense of duty.⁶⁹

If we accept this picture of norms, as a relation between a normative intension and a person that is dependent on the existence of a sense of duty, we get the problem of explaining how the same connection between a normative intension and a person is established when the norm is created by enactment.

According to Sundby, a person is said to create a norm by enactment if he expresses a normative intension under certain conditions. These conditions are that the person has competence to create norms of a certain kind. Such competence is given through the existence of competence norms. According to Sundby, these are qualificatory norms that decide which communicative acts count as valid enactments.⁷⁰ This must include a specification of who may perform the communicative act for the act to count as a valid enactment.

The problems appear when Sundby states that enacted norms logically may be reduced to internalised norms, only to go on to say that by enactment norms are created even if they are not internalised by those the norm regulates. He maintains that an enactment creates a norm independently of whether the content is accepted or not, liked or disliked, complied with or ignored, independent of the regulated persons' attitudes and behaviour.⁷¹ Suddenly the sense of duty, the feeling of obligation, the boundness to comply, cease to play any role. Sundby tries to tie

⁶⁸ Sundby 1974:p 127 -128.

⁶⁹ Sundby 1974:p 128 -129.

⁷⁰ Sundby 1974:p 151.

⁷¹ Sundby 1974:p 160-161.

the concepts of internalised and enacted norms together again by saying that the internalisation of some basic norms of competence creates a disposition in people to internalise the content of the enacted norms. I find this connection to be pretty thin, as such dispositions only create a certain *possibility* that the content of the enacted norm will become internalised. Either we must accept two different concepts, internalised norms and enacted norms, describing two basically different matters that are both called norms, or we must choose one set of defining criteria for the concept of a norm and keep to them.

I first tried Sundby's concept of internalised norms. I ended up with a subjectivistic account, deleting all enacted norms that were not also internalised by some person from the class of norms. This account seemed to fit with a concept of norms found in psychology, sociology and parts of moral philosophy, but it did not fit so well with a jurisprudential concept of norms. Next I tried to see what concept of norms we might get if we did not take internalisation, with its "sense of duty", to be constitutive of the concept. I then got an account of norms where norms are the result of enactment, but where such enactment does not create any specific connection to the persons regulated by the norm. We then have to leave Sundby's idea that the concept of a norm is a relational concept. Instead we may say that norms are entities created through a process of enactment of a normative intension. What relation there is between such a norm and the person regulated is left for further specification.

This view of norms is in accordance with a view presented by Pörn⁷². In the following I will describe Pörn's view of the concept of a norm as an alternative to Sundby's analysis.

5.2 The concept of a norm according to Pörn

It is not my intention to give anything like a complete description of Pörn's presentation of the interaction between the modalities of action and belief and normative modalities, nor of the semantics of these concepts. I will only present certain points from Pörn's analysis of the concept of a norm (in Pörn 1977) which are interesting in relation to Sundby's analysis.

⁷² Pörn 1977:Ch. 2.

Pörn does not make a distinction between normative intensions and norms. To Pörn norms are propositions stating what an agent should or should not do under certain conditions.⁷³ Pörn's notion of *having-an-intention* is that a person has a belief consisting of a normative proposition. If a person *a* has the belief that: on the condition of a red traffic-light he shall stop, then he has an intention to stop at a red traffic light. Pörn expresses having-an-intention as:

(P1) $B_a(p \rightarrow \text{Shall } E_a q)$

That is: *a* believes that if *p* then *a* shall bring about that *q*.

Such intentions are beliefs acquired through making a decision. If we may say that having-an-intention to act binds a person to follow a course of action specified in the intention, we see that there is a close resemblance between Pörn's concept of having an intention and Sundby's concept of having internalised a normative intension.

But there are also differences between these two concepts. According to Sundby, a norm created through internalisation may also create in the person *a* a feeling that other people than *a* are obliged to act in certain ways. According to Pörn, an intention is the belief of *a* that *a* shall act in certain ways. While if *a* has the belief that a person *b* shall act, then he has an *expectation* about *b*, not an intention to act. Furthermore Pörn warns the reader not to confuse *a*'s intention to do something on a condition with *a*'s belief that a norm is valid in a set of norms nor with his belief that a norm exists or is in force.⁷⁴

In order to describe the latter belief Pörn defines the notion of a normative system based on a set of given norms. S_K is a normative system with a basis *K* if and only if: whenever *K* is a set of given norms

1. *K* is a subset of S_K .
2. If there is a sequence $p_1, p_2, \dots, p_n$ ($n \geq 0$) of formulations of norms in S_K and, for some norm formulation *q*, $p_1, p_2, \dots, p_n \vdash q$, possibly in virtue of a set of presupposed logical, analytical or mathematical truths, then the norm

⁷³ Pörn 1977:p 21.

⁷⁴ Pörn 1977:p 25-26.

expressed by q is also a member of S_K .

3. Nothing else is a member of S_K .

Thus, the norm N is valid in K if and only if N is an element in S_K . Pörn writes:

"We shall say, finally, that a norm *exists* or is *in force* if and only if it is valid in a set K of norms each one of which has been admitted in an act of decision and not subsequently rejected in a decision of type cancellation."⁷⁵ Pörn wants to express that a believes that a norm is valid in a set K of existing norms and, hence, that the norm is in force as:

(P2) $B_a((p \rightarrow \text{Shall } E_a q) \in S_K)$

The belief of (P2) is clearly distinct from (P1), they are logically independent, and (P2) does not imply (P1). Hence, according to Pörn, believing that a norm is in force does not entail any intention by a to act in accordance with the norm. We need to specify independently what sort of relation it is between a 's belief that a norm exists and a possible intention in a to act in accordance with the norm.

Pörn finds it an interesting hypothesis that one of the reasons an agent always has when he acts intentionally is that he *wants* a state of affairs.⁷⁶ Pörn introduces, and formally defines, a new modal concept, an evaluative Ought, Ought p reading "it is an optimum that p " or "it is optimal that p ". Ought p neither implies nor is implied by Shall p . Pörn reads

B_a Ought p as " a wants that p (be the case)". He maintains

that the question why a performs a certain act is not given a final answer by pointing to a 's intention. A reason for acting must include the specification of his reason to intend, which is specified by pointing to what a wanted or thought best. Pörn writes: "In a project or its execution the agent always intends, ultimately and perhaps also more immediately, an action the reasons for which include a state of affairs wanted (thought best) by him. We shall accept this hypothesis and refer to it as the *principle of ideality*."⁷⁷ If we follow Pörn we do not have to say

⁷⁵ Pörn 1977:p 26.

⁷⁶ Pörn 1977:p 35.

⁷⁷ Pörn 1977:p 37.

that the relation between a norm and an intention to act in conformity with the norm is based on an inner compulsion by a feeling of duty as in Sundby. Instead we may say that the person chooses to act in conformity with the norm because in doing so he achieves something he wants, some state of affairs that he believe to be optimal.

Pörn emphasises that the principle of ideality should not be confused with the idea that if *a* intends to perform an action, then he also wants to perform this action. *a* may want a state of affairs *p*, and he may believe that a certain action is necessary to bring about that *p*. These two beliefs may be the condition on which an intention to do the action is formed without the further entailment that *a* wants to do this action. Here there is a parallel to Sundby, maintaining that the internalisation of a normative intension creates a distinction between what *a* feels that he ought to do and what *a* wants to do. But, there is a difference in that Sundby perceives an internalised norm as creating an inner compulsion to act even if the result of the act is evaluated negatively, while to Pörn an intentional act always originates in a positive evaluation that some state of affairs brought about by acting is optimal.

The advantages of Pörn's analysis of the concept of a norm are easily seen from Sundby's example about the consistent anarchist.⁷⁸ The anarchist has not internalised what Sundby calls the fundamental norms of competence, granting the state competence to enact norms. This entails that the anarchist has no basis on which enacted norms become internalised as norms for the anarchist. We have no reasons for maintaining that the anarchist is even disposed to internalise the enacted norms. Sundby writes that the enacted norms are not norms for the anarchist in any personal sense, they are only norms for him in the sense that he has to comply with them in order to avoid trouble. But as it is this personal meaning which is fundamental in Sundby's conception of a norm, it is problematic to maintain that these normative intensions are the content of norms when internalisation is not even held as a possibility.

Following Pörn's analysis we would say that the anarchist has the belief that certain normative propositions are members of a set of normative propositions that constitutes a certain normative system. That the anarchist believes that a norm

⁷⁸ Sundby 1974:p 163-164.

exists in this sense does not entail anything about how he relates to the norm by way of accepting the content of the norm or by complying with the norm. That he wants to avoid getting into trouble may be the final reason why he forms the intention of acting in conformity with the norm.

What Pörn might have analysed a bit further is his definition of what it means that a norm *exists*. In Pörn's account, a norm is initially defined as any proposition pointing out what a person shall or shall not do under certain circumstances. Later it is a condition for a norm to *exist* that the proposition has been admitted in a set of norms by an act of decision. Clearly it is not sufficient only to say that a norm is created through an act of expressing a proposition stating what a person shall or shall not do under certain circumstances, i.e.

$E_b(p \rightarrow \text{Shall } E_a q)$

because by the axiom of action logic $E p \rightarrow p$ we would get that; if *a* believes that *b* has created the proposition, then this proposition is also the content of *a*'s intention, i.e.

$B_a E_b(p \rightarrow \text{Shall } E_a q) \rightarrow B_a(p \rightarrow \text{Shall } E_a q)$

I find it necessary to distinguish between *normative propositions*, being just any proposition pointing out what a person shall or shall not do, and *norms* being normative propositions that are *valid* in a set *K* of norms by having been admitted in an act of decision. The analysis of the concept of norm will then require a further analysis of the concept of being valid and of the concept of being admitted in an act of decision.

As stated earlier I find it necessary to distinguish between the concept of logical validity, as truth in all logical models, and notions of legal or moral validity. As I see the concept of legal or moral validity, to say that a norm is morally or legally valid is equivalent to saying that the norm is a member of a set of moral or legal norms. We use a distinction between moral and legal validity to specify what kind of norm we are talking about by specifying what kind of normative system the norm belongs to. Accordingly we may say that a legal norm is valid in Finland but not in Norway to express that the norm is part of the Finnish

legal system but not the Norwegian. Furthermore there are different conditions for how to attain validity in different normative systems, for how a normative proposition becomes a member of a specific set of norms. This is often stated by saying that a person has a special competence to create norms with a certain validity. A person may have competence to create valid moral norms, but no legal competence to create valid legal norms.

By simply expressing a normative proposition a person may well have admitted the proposition into his own personal normative system. Unless we specify what kind of validity a norm has, the notion of validity only says that a norm is a member of one of a possibly infinite number of normative systems. To say that a norm is valid is just to state that it exists. But by specifying what kind of validity is attached to the norm in question, we say something about the system to which it belongs, and indirectly we say something about what kind of competence was required to create the norm.

This points further to the analysis of the concept of being admitted in an act of decision. Here Jones' theory of normative communicative acts may help to complete the analysis.

5.3 Jones - the creation of norms

One interpretation of Jones' analysis of normative communicative acts⁷⁹ is that it tells us something about how norms are created. When he claims that directives are performatives establishing a normative relation between speaker and audience, we may interpret this as saying that the communicative act of expressing a normative proposition is an act of creating a norm.

On this interpretation Jones' suggestion of possible truth-conditions for normative propositions will be interpreted as constitutive conditions for the creation of a new norm. A directive will then be said to be true if the conditions for creating a norm of the type intended by the communicator are fulfilled.

According to this interpretation we may say that to create a personal norm expressing a request or advice does not call for any specific competence in terms of relations of power or

⁷⁹ Jones 1983:Ch IV. For a presentation, see section 2.6 in this thesis.

authority between communicator and recipient. The single condition to create such norms is a sincere expression of the normative proposition. In addition we might see Jones' analysis of the conditions for a successful communicative act as an analysis of our general competence as language users to transfer information with the help of signs or sounds.

To create a norm expressing a command, on the other hand, requires a special competence in addition to making a sincere expression of the normative proposition. If the norm is simply a personal norm, a member of the set of norms the communicator believes to exist and expects people to follow, then this competence may possibly be analysed in terms of the relations of physical power and personal authority between communicator and audience. If the communicator wants to create a norm with some special validity, like for instance legal validity, we will require a further analysis of the notion of competence in question. This is outside the scope of Jones' work.

Sundby writes that an imperative⁸⁰ communicative act is complied with for strategic reasons, as a wish to please the communicator or because of fear of sanctions, but it does not create a norm for the audience.⁸¹ For a norm to be created, the communicative act must be made in a situation where certain extra-linguistic norms of competence qualify the communicative act as an enactment of a new norm. So according to Sundby, the existence of competence is not a matter for empirical investigation, but a question about the occurrence of a preexisting system of norms regulating what acts count as acts of admittance of new norms.

I hold it to be impossible to distinguish between imperatives that are complied with only for strategic reasons and imperatives that give rise to norms. In accordance with the theory of norms that has been presented through the exposition of Pörn and Jones, I will say that any successful imperative communicative act creates a norm of the imperative type. But the conditions for a successful imperative communicative act will vary depending on what kind of validity the communicator intends the imperative to have.

If we say, with Sundby, that the condition for an

⁸⁰ Sundby seems to perceive imperatives as a subclass of directives.

⁸¹ Sundby 1974:p 149.

enactment of a norm is the pre-existence of other norms, we may easily be criticised for having a circular definition of the concept of a norm. The condition for the creation of a norm is the existence of another norm. But how then was the primary norm created? To me this suggests that the concept of having competence is a very complex concept that is in dire need of further analysis. We need a better understanding of this concept of competence in order to fully understand what it means that a norm is created through an act of admittance into a normative system. But to pursue this analysis further, is for me still a future task.

Part two - Formalization of norms

6. Formalization in general

In this second part of the thesis I will discuss different attempts to formalize knowledge about norms. In the present chapter I will discuss formalization in general. Apparently there is some distinction between formalization in the context of making logical models and formalization in the context of making computer programmes. I will discuss what may be the reason for a possible difference between these two types of formalization. The difference has been expressed most clearly as a hesitation among logic programmers to make use of earlier work on deontic logic. In the next chapters I will discuss the use of deontic logic in formalizing a normative situation of the type presented in the so called "Chisholm paradox".

6.1 Formalization as logical models

Formalization is a process by which a piece of knowledge is adapted for mechanical processing. Traditionally the notion of formalization has been connected with the idea of constructing an axiomatic system from which new theorems may be deduced by a rule of inference. According to this idea, to formalize a piece of knowledge is to

- a) propose a syntax of a language in which core concepts of the knowledge may be expressed,
- b) propose as axioms of the system a set of sentences that expresses our basic intuitions about the relations between the core concepts,
- c) propose one or more rules of inference by which new theorems may be deduced.

The purpose of a formalization of this kind is partly to generate new theorems that may strengthen or re-educate our less basic intuitions concerning the relations between the core concepts. In this kind of formalization "mechanical processing" is understood as the process whereby a statement may be proved to be a theorem of the logic by starting from the axioms and applying the

rule of inference recursively to produce the theorem.

This method is usually termed "the axiomatic method" or "the syntactical method". This method has been much criticised for being too simplistic. We want a deeper analysis of the *meaning* of the concepts involved. Jaako Hintikka has written⁸² : "To obtain such an analysis, syntactical methods often have to be supplemented by semantical (model-theoretical) ones. That is to say, we have to ask what conditions the truth of a set of statements imposes on the world, or (equivalently) what kinds of 'possible worlds' there must be in order for a set of statements to be consistent." The semantical method is to supplement an axiomatic system with another formal system in which the truth-conditions of the statements in the axiomatic system are expressed. According to Hintikka, the purpose of making a formalization of the semantical kind is to make an *explanatory model* in which certain aspects of the workings of our ordinary language can be understood. He further states that such a model, like other scientific models, has to be invented. It is not a mere description of language uses. He writes⁸³: "It seems to me that the difference between an approach to the logic of ordinary language in terms of my 'explanatory models' and an approach to it in terms of 'what we ordinarily say' or in other paradigmatic terms is to a large extent a difference between a genuine theory of the meaning of the words and expressions involved and a mere description of the raw data of language."

Hintikka's proposal is that by these formal methods we may say something about the basic meaning of the concepts in question, something about the main purpose which these concepts serve. However the formal model does not give an accurate reflection of pieces of natural language discourse. We then would have to take into account certain additional factors. Hintikka lists the following factors:

- (i) Other purposes competing with the main purpose.
- (ii) Various pragmatic pressures, such as the pressure not to use circumlocutions without some specific purpose⁸⁴.
- (iii) Various built-in limitations of the human mind, e.g., the limitations on one's short-term memory.
- (iv) The pressures due to the particular context in which a

⁸² Hintikka 1969:p 3.

⁸³ Hintikka 1969:p 14-15.

⁸⁴ see. Grice 1975 as referred in Jeffrev 1981:p 76-77.

sentence is uttered or written.

These factors are often grouped together as *pragmatic* or *contextual* factors. To explain what happens in ordinary discourse we will need both a model of the basic meaning of the concepts used and of all the pragmatic factors that serve to modify this basic meaning in a certain situation. Hintikka wants to say that these factors serve to give the concept different *residual* meanings. He writes⁸⁵: "In other words, a difference between the different logical powers a word or an expression has on different occasions would indicate a real difference in sense if and only if it cannot be explained away (in terms of such factors as (i)-(iv)) but has to be reproduced in our explanatory model." (To give a more specific account of the different pragmatic factors that determine the residual meaning of certain concept is a task that I will not pursue any further in this exposition.)

In the following six statements Hintikka has given a more complete expression of what, in his opinion, is the purpose of formalizing a piece of knowledge, of what we hope to achieve by constructing an explanatory model⁸⁶:

- (1) The use of our intuitions for the purpose of obtaining criteria of truth and/or consistency. (These will then also yield rules of logical proof as a spin-off.)
- (2) The re-education of some of our intuitions in the light of the semantical insights thus obtained.
- (3) The interpretation (which sometimes amounts to a partial reinterpretation) of traditional concepts and doctrines within the framework which the analysis has produced.
- (4) The development of methods of bringing out the truth of our intuitions in subtle and roundabout ways.
- (5) The discovery of intrinsic ambiguities in some of the concepts we use in ordinary discourse.
- (6) The exposure of fallacies to which one is led by overlooking these ambiguities.

This may be seen as a program for analytic philosophy. The discussion about law and morality among analytically minded philosophers has resulted in the proposal of a number of different *deontic logics*. An evaluation of the usefulness of these logics has traditionally been an assessment of how well they fulfil (1)-(6).

⁸⁵ Hintikka 1969:p 12.

⁸⁶ Hintikka 1969:p 184.

6.2 Formalization as computer programmes

As stated initially, formalization is a process by which a piece of knowledge is adapted for mechanical processing. With the advent of digital computers formalization has also become associated with the process of translating a piece of knowledge into a formal language which the computer may use for doing automatic calculations on the basis of that knowledge. During the 1970's two interesting developments happened. First, we saw the beginning of many different attempts to translate knowledge about law (as well as many other non-formal areas of knowledge) into existing programming languages. Second, we saw the first programming languages which allowed for the expression of knowledge in terms closely related to the logical models described earlier. This has been termed *logic programming*, and it was a spin-off from a long term effort (still going on) to make general automatic theorem provers for various logics.

These two developments have given rise to several interesting attempts during the 1980's to formalize knowledge about the law by the use of logic programming. What is striking about these attempts is this: even if the "logic programmers" formalized knowledge about law by making logical models, there seems to have been very little interplay between their work and the work of analytic philosophers making deontic logics. This fact has led me to ask the following questions:

A) Are the criteria for assessing the usefulness of these logical models different from the criteria (1)-(6)? If so, what is the difference?

B) Can it be shown that the distinctions captured in work on deontic logic are basic to any representation of law (or morality) such that failure to represent these distinctions exposes the formalism to serious fallacies?

In order to answer these questions I will discuss the work done by the Logic Programming Group at Imperial College (London) on formalizing law as logic programmes.

In the Logic Programming Group (LPG) they have completed a number of projects in which they have formalized various parts of British law as logic programmes. They have

published a number of papers presenting the results and discussing the programs in relation to other attempts at making "legal knowledge based systems". I base my discussion on these papers.⁸⁷

6.3 Close resemblance to the original text

One of their aims has been to make a representation of the legal statutes in which the statements in the programming language resemble the original (natural language) texts as closely as possible. In doing this they found the logic programming language PROLOG superior to other programming languages. In PROLOG it is possible to write the program statements that have an easy declarative reading resembling natural language. In other (traditional) programming languages the representation of what the law says is second to a representation of how the law applies; each program defines a specific algorithmic application of the knowledge represented. They argue that compared to these programs, a PROLOG program is easier to write, easier to read, easier to change if the legal texts are changing, easier to use for different, and maybe not yet specified, purposes/applications. They also maintain that with a PROLOG program it is easier to control that the representation gives a accurate rendering of the legal texts, and that it is desirable to give an accurate rendering of what is written in the legal texts in order to vest the inferences made by the program with a certain authority as convincing legal arguments.

These considerations concerning the usefulness of the logical model are new. They are concerns about the user friendliness of the program; the user shall be able to understand what is represented and be convinced that it is correct. As regards Hintikka's criteria, I am convinced that we might add that in making our explanatory model, the statements in the logic should preferably have an easy intuitive reading. But what is promoted by LPG is more than this, since they wish to have an immediate readability as if the statements were written in natural language. I think the value of this criterion (that the representation should have close resemblance to the original text) is worth questioning.

⁸⁷ See for instance Bench-Capon 1989, Bench-Capon & Sergot 1988, Sergot 1982, 1988, 1990, Sergot et.al. 1986.

First, we might question whether this gives the inferences made by the program authority as convincing legal arguments. I believe this to be true only to a very limited extent. The rules are only paraphrases of the original statutes, and as such they are open to questioning as to whether the rendering is in fact correct. More serious, as pointed out by Sergot, a word to word rendering is impossible; instead one must identify *intelligible units of law* as a basis for the interpretation.⁸⁸ I believe this identification to be rather difficult. The admission that such an identification is necessary is an invitation to enter into a discussion of all that is covered by the general term "legal method" or "legal interpretation". In the end the authority of the inferences as legal arguments will be measured with the criteria of jurisprudence.

Whether the inferences are good jurisprudence or not is not simply answered by saying that the rules give a careful rendering of the statutory texts as they stand. Members of the legal profession will demand that the inference be based on a representation of the meaning content of the statutory texts as interpreted in the light of the meaning of other relevant legal sources. Some would also wish to say that the meaning is found by interpreting the texts with the help of an indefinite number of more or less explicitly expressed legal principles⁸⁹. Sometimes one has a feeling that legal interpretation is a kind of holistic process that is impossible to represent, and that it is impossible to describe legal interpretation more exactly than to say that it is a process of thought that takes place in the mind of a legally trained human. I do not think it is necessary to take such a negative view of the possibility of representing the process of legal interpretation, nor do I believe that legal training will always be the required background for making justifiable representations of the meanings of statutory texts. But one needs to be alert to the possibility that other legal sources and legal principles may have an effect on the meaning of the text one is about to represent.

Second, we might ask what is captured by the logical model by which the inferences of the program are produced. Thorne McCarty has criticised LPG for using long hyphenated predicates in their representation instead of making "deep conceptual models" of the law. Sergot defends LPG by saying

⁸⁸ Sergot 1988:p 18.

that they are forced to use such long predicates to capture the actual wording of the statutes. But, even if LPG emphasises the close similarity between the representation and the original statutory texts, they do not attempt to make a model of general linguistic structures of the language in a particular piece of text. They do not discuss any such problems as in the construction of Montague-grammars and the like. Their work is clearly on a par with work in deontic logic in the sense that it is work on modelling the logical power of *some* of the concepts expressed by the text.

The long hyphenated predicates are defined in terms of other simpler predicates if the long predicates are central to the understanding of the statutory text in question. LPG strongly defend a "top-down" approach to the representation of legal texts as the only viable possibility. Their programs are essentially a downward refinement of definitions, starting with a complex concept such as "British citizenship" (expressed by a long hyphenated predicate), and defining this concept in terms of concepts whose satisfiability is easier to verify, such as date and place of birth, nationality of the parents etc. At any time and level of refinement of definition the program is executable. The program will assess the satisfiability of the most primitive concepts at that time by querying a database or a user. It is always conceivable that the primitive concepts may themselves be defined by the help of still more primitive concepts. But, further refinement of definition may be postponed until one finds a need to make it easier for the user to answer the program's queries about satisfiability of the primitive concepts. A further refinement may also be required if, as a result of legal developments, new layers of meaning are added to one of the primitive concepts by the establishment of new conditions for the satisfaction of the concept.

Sergot maintains that this top-down approach to formalizations of actual pieces of law is a more viable approach to making logic programmes than the "bottom-up" approach used by McCarty. The bottom-up approach starts by proposing a set of primitive, undefined concepts (e.g., action, temporal and deontic concepts) and goes on to define more complex concepts in terms of relations between the primitive concepts. Sergot points to a practical problem of choosing what should be the primitive concepts, because we do not know from the outset which

"common world" concepts will be relevant to the formalization. He comments that none of the different logic programmes they have made (nor McCartys TAXMAN program) have any primitive concepts in common.⁹⁰

To a certain extent Sergot is right in defending a top-down approach to the formalization of legal texts, because the conceptual structures of law and the common sense which the legal texts are founded on, are together so rich that a general, all-encompassing formalization would today not be computationally viable. Also such a grand formalization would be very difficult to construct.⁹¹ Therefore, for all practical purposes it is necessary to select some tiny fragment of the law, to sort out what are the most important concepts within that fragment, and to represent these in the top-down fashion described. Sergot's point is also that, in order to make the selections, we need to know something about the practical purposes to which the program will be put. But, as Sergot points out himself, there may be *some* concepts which are fundamental to our general understanding of the law, and which are common to many types of legislation. We might want to *ground* the logic program on a representation of such concepts. I think this is the essence of McCarty's demand for deep conceptual models.

6.4 Practical utility

In Sergot's concern with the *practical utility* of a program in a certain context of practical tasks, I see another criterion that is new in regard to the set of criteria presented by Hintikka. The philosophical interest has mainly been a theoretical interest. It is an interest in acquiring a deeper understanding of law and morality and in expressing this understanding as clearly as possible. The practical utility of such a deepened understanding is rather indirectly achieved through helping people to think straight about complicated issues. That philosophy may have such a

⁹⁰ Sergot 1988:p 33.

⁹¹ Attempts to make general common sense systems has been made, see for instance the CYC-project at Univ. of Texas at Austin

practical utility is seen in the adoption of Hohfeld's analysis⁹² of the concepts of legal rights and privileges in jurisprudence and by judges. Hohfeld's analysis may be said to have exposed the fallacies to which one was led by overlooking the ambiguities in these concepts.

The practical utility which is demanded of programmes made by LPG and other makers of software products is much more direct. The program is to be used to process cases in public administration or to give advice in legal questions. This concrete demand that the program must fulfil a certain practical function to some extent overrides all theoretical interests in being able to represent theoretically important concepts and distinctions. The philosopher is asked to demonstrate that the system will not be able to fulfil the task it is designed for unless his cherished concepts and distinctions are represented in the system. Much of the argumentation by LPG against the necessity of including deontic logic into a representation of the law has rested on this argument⁹³, and of course it is possible to design programs that do many valuable tasks and fill many practical needs without a representation of deontic logic. On the other hand, I believe it is possible to find many practical tasks within public administration and the legal system in which genuine deontic reasoning plays a part. Certainly, it is only to a limited extent possible to give advice on legal matters without engaging in any form of deontic reasoning. It is first when the program is supposed to fulfil such tasks that it would be possible to point out possible fallacies made by overlooking the genuine logical power of deontic concepts.

⁹² Hohfeld 1966, especially the introduction by Cook.

⁹³ See for instance Bench-Capon 1989.



7. Chisholm's paradox

In what follows I will first attempt to describe what I see as the key issues in deontic logic. I will do this by giving an exposition of different solutions to the so called "Chisholm paradox". Sergot has made an attempt to include deontic concepts in the representation while ignoring all the technical machinery of the semantic analysis used in more orthodox approaches to deontic logic.⁹⁴ The presentation in this chapter prepares the ground for a discussion of Sergot's representation of deontic concepts. I have therefore chosen a version of the Chisholm paradox that may be seen as inherent in the library regulations which are the basis for Sergot's representation. In the next chapter I will give a detailed presentation of Sergot's attempt to represent deontic concepts, before I go on to discuss how well this attempt captures the distinctions that one has attempted to express by using the semantic method in deontic logic. In this way I will attempt to answer the second question posed in chapter 6., concerning whether there are distinctions captured by deontic logic that are basic to any representation of norms, and which are such that failure to represent them exposes the formalism to serious fallacies.

Sergot's attempt to represent deontic concepts is presented in an attempt to formalise the library regulations at Imperial College. The interesting Library Regulations are the following:

LR1. Books should be returned by the date due.

LR2. Borrowers must not exceed their allowance of books on loan at any one time.

LR3. No book will be issued to borrowers who have books overdue for return to the library.

Book Allowances: Undergraduates 6, Postgraduates 10, Academic staff 20.

Jones has the following to say about the Library Regulations: "Given the kinds of structures which we have seen to be exhibited in the regulations, it is perfectly conceivable that, for a given case, the situation might have the following

⁹⁴ Sergot 1982.

characteristics:

1. x shall return book y by date due.
2. If x does return book y by date due, then disciplinary action against x shall not be taken.
3. If x does not return book y by date due, then disciplinary action shall be taken against x.
4. x does not return y by date due.

We will no doubt agree that this set of four sentences is consistent - each of 1-4 may be true at one and the same moment of time - and that the members of this set are logically independent of one another (none of them logically implies any of the others). Yet the task of providing a formalization of the set which meets these two requirements has proved to be very tricky: those familiar with deontic logic will see that we have here an instance of the puzzle known as Chisholm's "paradox". (See, e.g., Jones & Pörn 1985, for a discussion)⁹⁵

To understand the problem raised by the Chisholm paradox (CP) that Jones is hinting at, it is convenient to look at these sentences as expressed in (Jones & Pörn 1985). We would then reformulate these sentences in the following way:

- 1) It ought to be that x returns book y by date due
- 2) It ought to be that if x returns book y by date due, then no disciplinary action is taken
- 3) If x does not return book y by date due, then disciplinary action ought to be taken.
- 4) x does not return book y by date due

These sentences will be referred to as "the Chisholm set".

7.1 Representation in Standard Deontic Logic

Standard deontic logic (SDL) is the system that results from adding a monadic deontic operator O, to be read as *it ought to be that...*, to propositional logic. According to Chellas⁹⁶ we

⁹⁵ Jones 1990:p 5.

may see SDL as a normal system of modal logic of the type KD.

Axioms of the system are:

the tautologies of propositional logic;

that tautologies ought to be the case, OT;

that contradictions ought not to be the case, $\sim O\perp$;

that if there is an obligation to do **p** and an obligation to do **q**, then there is an obligation to do

p & **q**, $(Op \ \& \ Oq) \rightarrow O(p \ \& \ q)$; where $\sim$ is negation, & is

conjunction, $\rightarrow$ is material implication, **T** represents tautologies

(the true), $\perp$ represents contradiction (the false).

The one rule of inference is:

$$\text{ROM} \quad \frac{p \rightarrow q}{Op \rightarrow Oq}$$

In SDL special care has been taken to design a semantic model that makes invalid the formula

$$\text{TO} \quad Op \rightarrow p$$

stating that if it ought to be that **p** then that **p** is *actually* the case.

In SDL this is done by requiring that the accessibility relation in the semantic model is not reflexive. Instead the relation is required to be serial, in order to validate the formula

$$\text{OD} \quad Op \rightarrow \sim O\sim p$$

Where **Pp** - “**p** is permitted” is defined

$$\text{Def-P} \quad Pp =_{df} \sim O\sim p$$

OD may then be expressed as

$$Op \rightarrow Pp$$

An alternative axiomatization is given by the formula OD and the rule of inference:

$$\text{ROK} \quad \frac{(p_1 \ \& \ \dots \ \& \ p_n) \rightarrow q}{(Op_1 \ \& \ \dots \ \& \ Op_n) \rightarrow Oq} \quad (n \geq 0)$$

Chisholm supposed that the sentences 1) to 4) would be represented in SDL as follows:

- 1a) Op
- 2a) $O(p \rightarrow \sim q)$
- 3a) $\sim p \rightarrow Oq$
- 4a) $\sim p$

From 1a) and 2a) we may derive $O\sim q$, and from 3a) and 4a) we may derive $O\sim q$ and hence $\sim O\sim q$, which means we get a contradiction. If we try to solve the problem by replacing 2a) by

$$2a') \quad p \rightarrow O\sim q$$

we get consistency, but 2a') is logically dependent on 4a) as

$$\sim p \rightarrow (p \rightarrow O\sim q)$$

is valid. If we try to replace 3a) by

$$3a') \quad O(\sim p \rightarrow q)$$

we also get consistency, but 3a') is logically dependent on 1a) as

$$Op \rightarrow O(p \text{ or } q)$$

is valid⁹⁷. Consequently it is impossible to represent the situation described in sentences 1) to 4) in SDL without losing either consistency or logical independence. This has created a demand for a deontic logic that is expressively rich enough to represent the Chisholm set without losing either i) consistency or ii) logical independence.

We would also demand that a solution to Chisholm's paradox meet some further requirements. To understand what these requirements are it is necessary to be aware of a difference between the attempts to solve the paradox. Some will maintain that 1) and 2) should be taken to imply 5) *It ought to be that no disciplinary action is taken*, others maintain that 3) and 4) should be taken to imply 6) *It ought to be that disciplinary action is taken*. But, as was seen, we do not want both 5) and 6) to be true at the same time, in any formalization.

A sentence qualified by the deontic operator O (such as 1a and 2a) may be called a deontic sentence; a sentence not qualified by the deontic operator (such as 4a) may be called a factual sentence; a sentence where some part of the sentence is qualified by the deontic operator O and some part is not so qualified (such as 3a) may be called a mixed sentence. If we maintain that 5) may be represented as 5a) $O\sim q$, and that it should be possible to detach 5a) from 1a) and 2a), then we require a *deontic detachment* to be made. If we maintain that 6) may be represented as 6a) Oq , and that it should be possible to detach 6a) from 3a) and 4a), then we require a *factual detachment* to be made. Loewer and Belzer 1983 find that they can distinguish between attempts at solving Chisholm's paradox according to whether the first or second of these detachments are proposed. So we may say that any solution to the Chisholm paradox should present us with (iii) certain detachment properties.

Hintikka has in several articles argued that by the difference between the sentences 2a) and 3a) it is possible in SDL

⁹⁷ The truth of $Op \rightarrow O(p \text{ or } q)$ is in itself problematic. It is termed Ross's paradox as Ross presented it as a problem for SDL for such an interpretation as "If you ought to post the letter, then you ought to post the letter or burn it". Ross' paradox follows from the fact that $p \rightarrow (p \text{ or } q)$ is a tautology of propositional logic, given ROK. This is termed "the problem of consequential closure". In this work I will not venture into a discussion of the problem of consequential closure.

to represent a distinction between "a prima facie obligation" and "an actual (absolute or overall) obligation"⁹⁸. 3a) expresses that in the actual world an obligation to do *q* is a consequence of the fact that *p*. 2a) does not express any actual obligation to do *q* on the condition that *p*; 2a) expresses that in all deontically ideal worlds *q* is materially implied by *p*. From this we cannot deduce an obligation to bring about that *q* from the fact that *p* is true in the actual world, i.e. we do not have:

$$(p \ \& \ O(p \rightarrow q)) \rightarrow Oq$$

It may be proved that if we did have this sentence as a sentence of SDL, the logic would collapse into propositional logic, i.e. we would have:

$$Op \leftrightarrow p$$

Whatever actually happens we are not able to derive any actual obligation to bring about something from a prima facie obligation, as Hintikka represents it.

Several authors have criticised Hintikka's proposal to use the distinction between 2a) and 3a) to express the distinction between prima facie and actual obligations within SDL⁹⁹. The paradoxes generated in SDL force us to find a better logic anyway. But we might add as still another criterion (iv) that a solution to the Chisholm paradox should give us means to express the distinction between prima facie and actual obligations. And finally, (v) we would like to see arguments as to why the sentences 2a) and 3a) should not be represented as having the same logical form with respect to the position of the deontic operator.

In summary, this analysis of the Chisholm paradox enables us to express a set of criteria to be met by an attempt to give a formal representation of deontic concepts. We want to be able to represent the Chisholm set such that:

⁹⁸ Hintikka 1969b: p 203, and Hintikka 1971: p 93.

⁹⁹ See Loewer and Belzer 1983: pp 313-315, van Eck 1982: pp 251-258, van Eck refers to Bergström, L. "Hintikka on prima facie obligations" *Theoria* vol. XI 1974

- i) the set of sentences is consistent
- ii) the sentences are logically independent of each other
- iii) the formalism expresses certain detachment properties
- iv) the formalism allows us to express a distinction between prima facie and actual obligations
- v) arguments must be provided if 2a) and 3a) are to be represented as having basically different logical forms.

7.2 Representation in dyadic deontic logic

Loewer and Belzer 1983 (L&B) pick out David Lewis 1974 and Azizah al-Hibri 1978 as examples of two approaches to solving the Chisholm paradox. They have in common that they want to solve Chisholm's paradox partly by augmenting SDL with a two-place deontic operator $O(p/q)$, read as, "it ought to be that p given q ". This is a genuine conditional obligation, and deontic logics using this operator are called "dyadic" deontic logics. The monadic deontic operator used in SDL is defined as:

$$Op = O(p/T)$$

where T is the tautology $(p \text{ or } \sim p)$. In a dyadic deontic logic we may represent the Chisholm set as:

- 1a) Op
- 2a*) $O(\sim q/p)$
- 3a*) $O(q/\sim p)$
- 4a) $\sim p$

This set is consistent, and its members are logically independent, but L&B find that none of the logics proposed for the new dyadic operator capture what they take to be our intuitions about the Chisholm set.

David Lewis has proposed several systems of dyadic deontic logic, all of them allowing a *deontic detachment* to be made but not a *factual detachment*. That is, Lewis' logics validate the sentence

$$7a) \quad Op \ \& \ O(q/p) \rightarrow Oq$$

but they do not validate the sentence

$$8a) \quad p \ \& \ O(q/p) \rightarrow Oq$$

In the possible world semantics Lewis introduces a simple ordering on possible worlds, intuitively a ranking induced by some system of values. Lewis defines the truth-condition of $O(q/p)$ so that it states that: $O(q/p)$ is true at a world w if and only if worlds at which $p \ \& \ q$ is true are ranked before any worlds at which $p \ \& \ \sim q$ is true. To evaluate $O(q/p)$ we look at the worlds which are closest to being ideal at which p is true. If q is true at all these worlds then so is $O(q/p)$. $O(q/T)$, according to Lewis's interpretation, states that at all the most ideal worlds q is true.

L&B's criticism of Lewis is summed up in the following passage: "Within Lewis's framework, it appears that we cannot even express actual obligations. As we observed, O_p says that p holds in deontically ideal worlds. Even if OA , it might be that actually it ought to be that $\sim A$. $O(A/B)$ doesn't seem to express an actual obligation either. It expresses the conditional obligation that A given B . Even if B is true it doesn't follow that there is an actual obligation that A , for $O(\sim A/B \ \& \ C)$ and $B \ \& \ C$ might be true as well. If $O(A/B)$ is true then B provides a reason for there being an actual obligation that A , since in all the deontically ideal B worlds A is true. But it is a *defeasible* reason. This suggests that we interpret $O(A/B)$ as saying that there is a *prima facie* obligation that A least when B is true. In fact, Lewis appears to be a logic of *prima facie* ought statements. At best it is incomplete. In so far as Chisholm's story involves *actual* obligations it cannot even be expressed in Lewis."¹⁰⁰

Despite this criticism we might point to an advance in Lewis' system in comparison with SDL, in that it allows us to represent *prima facie* obligations as defeasible obligations. This is an advance on Hintikka's proposal to represent *prima facie* obligations as deontic conditionals, i.e. $O(p \rightarrow q)$, in SDL, because SDL contains the augmentation principle. The augmentation principle follows from the fact that

¹⁰⁰ Loewer and Belzer 1983: p 300.

$$(p \rightarrow q) \rightarrow ((p \ \& \ r) \rightarrow q)$$

is a valid formula of propositional logic. In SDL the augmentation principle gives an unwanted *indefeasibility* of obligations that leads to the so called Susy May paradox:

$$O(p \rightarrow q) \rightarrow O((p \ \& \ r) \rightarrow q)$$

which may be read as:

If it ought to be that if John impregnates Susy May he marries her, then it ought to be that, if John impregnates Susy May and Susy May is married, then he (still has an obligation to) marry her.

Thus, we would like to be able to represent certain obligations as being defeasible. But, in certain situations we would also like to be able to infer an unconditional, *actual* obligation. As this is not possible in Lewis' system, his system is insufficient.

L&B go on to consider a class of deontic logics exemplified by Al-Hibri's system. Her system validates 8a), *factual detachment*, and not 7a). Her semantics, informally speaking, assigns to a world *w* and a condition *p* a set of worlds which are the "best achievable from *w* with respect to *p*"¹⁰¹. In Al-Hibri's system *Oq*, or *O(q/T)*, means that *actually* it ought to be that *q*. L&B find Al-Hibri's intuitive account of the meaning of *O(q/p)* to be obscure. Their main objection to her system, however, does not hang on this obscurity, but on the fact that in her system it is not possible to detach an actual obligation *O~q* from the sentences 1a) and 2a*). If Al-Hibri allowed such a deontic detachment as well as the existing factual detachment, she would of course get an inconsistent representation of the Chisholm set. Still L&B argue that there is a situation immediately preceding the one described in the Chisholm set, a situation where the fact of 4) *x does not return the book by date due*, is not yet true. In this situation they would want to be able to make the deontic detachment. L&B use this argument to introduce the need for temporal reasoning in the solution of Chisholm's paradox.

¹⁰¹ Loewer and Belzer 1983: p 301.

7.3 Representation in temporal deontic logic - OT

L&B are convinced that one of the appropriate clues to solving Chisholm's paradox is to represent obligations as being relative to instants and periods of time. This is also a typical feature of a whole class of attempts to solve Chisholm's paradox.¹⁰² L&B design a system OT that includes a description of different time instances, where time indices are attached to the modal operators. If we let *t* represent the time immediately before "by the date due" has passed and *u* the time immediately after "by the date due" has passed, we may represent the Chisholm set as:

1a**) $O_t p$

2a**) $O_t (p \rightarrow \sim q)$

3a**) $\sim p \rightarrow O_u q$

4a**) $\sim p$

1a**) means that at *t* it actually ought to be the case that *p*, 2a**) means that at *t* it ought to be the case that if *p* then not *q*, 3a**) means that if not *p* then at *u* it ought to be that *q*, and finally 4a**) states that not *p* is the case. We may now detach $O_t \sim q$ from 1a**) and 2a**) and $O_u q$ from 3a**) and 4a**), but there is no contradiction. Also each sentence is logically independent of the other sentences.

L&B add as a semantic restriction that: if at a time *t* it is no longer possible to make it the case that *p*, then there can no longer be an actual obligation that *p* is the case. This introduces an uncertainty as to whether sentences 1a**) to 4a**) are true at the same time as originally construed by Chisholm. In a sense the sentences now express that it was the case at *t* that *p* ought to be the case, but as it is now the case that not *p* there is no longer an obligation that *p*, but we may derive an obligation from 3a**) that at *u* it ought to be that *q*. 4a**) seems to exclude the truth of 1a**) and 2a**). If this is the case, we have no longer have a representation of the situation described by sentences 1. to 4., if these are all assumed to be true at the same time.

¹⁰² See. Thomason 1981, Åqvist & Hoepelman 1981, van Eck 1982.

However, L&B's have different reasons for being dissatisfied with this representation in OT. They find it awkward that sentences 2) and 3) should have such different translations (i.e. criterion (v) is not satisfied). They find that material implication leaves us vulnerable to logical dependencies, in that 3a**) is logically dependent on p being the case, and in that 2a**) is logically dependent on $O_1 \sim p$ being the case (i.e. criterion (iii) is not met satisfactorily).

Although L&B include temporal indices in their representation, they do not believe that reference to time is in itself sufficient to explain the deontic-logical problems posed by the Chisholm set. L&B write that: "But from the semantical perspective of OT it must appear completely mysterious that at one time it ought to be that A while at another time it ought to be that $\sim A$. The question is how are the actual obligations at t determined?"¹⁰³

7.4 Representation in Loewer & Belzer's system 3-D

L&B's answer is that what actually ought to be the case is determined by a system of norms and by picking out all and only the facts that are normatively (ethically, legally, ...) relevant in a specific situation. They design a system called 3-D, where they combine OT with Lewis' system. Their core idea seems to be that norms pick out ideal future courses of events, ideal histories. As time proceeds some of these ideal histories become unattainable, but still "the actual obligation is to bring about one among those best histories that remains".¹⁰⁴ At each point of time it is possible to distinguish between defeasible and indefeasible obligations, and to determine how to detach actual, indefeasible obligations from *prima facie*, defeasible obligations. I will give a rather lengthy quotation from Belzer 1987 which expresses the main idea:

"The semantics of 3-D is based on the supposition that a system of norms i induces a ranking $\$i$ on possible worlds with respect to the degree to which the world comply with the norms of the system... This ranking allows for the semantic evaluation of defeasible *prima facie* conditional normative statements.

¹⁰³ Loewer and Belzer 1983: p 307.

¹⁰⁴ Loewer and Belzer 1983: p 308.

$O(B/A)$ holds relative to a world h , at a time t and a normative index i (let $v = \langle h, t, i \rangle$ be a *perspective*) if, and only if, there is some world at which $A \& B$ is true that is ranked more highly in $\$v$ than any world at which $A \& \sim B$ is true... Let a proposition A be *settled* at $v = \langle h, t, i \rangle$ just in case A is true at each of the worlds accessible at v ; and let LA say that A is settled... Let $\$*v$ refer to the ranking $\$v$ restricted to the worlds accessible at v . The a.t.c. ["all things considered", indefeasible (my comment)] norm which we express as $!(B/A)$ holds at v just in case there is some $A \& B$ world ranked more highly in $\$*v$ than any $A \& \sim B$ world.

Suppose that $O(B/A)$ and LA hold at v . Can we conclude that $!B$, that is $!(B/T)$ for tautology T , holds at v ? No, for there may be some C that is such that both LC and $\sim O(B/A \& C)$ hold at v , in which case $O(B/A)$ may be said to be *defeated* at v ; and it may indeed be the case that B does not hold at each of the most highly ranked worlds in the restricted ranking $\$*v$. However we can infer $!B$ at v if we know both that $O(B/A)$ and LA hold at v and that there is no proposition that holds at v and that defeats $O(B/A)$. Let $U(B,A)$ say "there is no proposition that holds and defeats $O(B/A)$." Truth conditions for $U(B,A)$ can be given in terms of the model of branching worlds ranked by the system... The following schema is valid in 3-D:

$$(3d) O(B/A) \& LA \& U(B,A) \rightarrow !B.$$

This allows one to infer unconditional a.t.c. norms from the defeasible principles expressed by $O(B/A)$." (end of quotation)¹⁰⁵

In L&B 1983 they distinguish two different detachment principles. (3d) is similar to their specification of a *factual detachment*. In the notation of Belzer 1987 L&B's *deontic detachment* would be written:

$$O(B/A) \& !A \& U(B,A) \rightarrow !B.$$

This is also a valid formula of 3-D. L&B's solution of the Chisholm paradox is to say that Chisholm has left us uncertain about whether there are facts in the situation that defeat the conditional obligation $2a^*) O(\sim q/p)$, i.e. we have to add the assumption $U(\sim q, p)$ to be able to make the detachment

¹⁰⁵ Belzer 1987:p 157.

7a*) $!p \ \& \ O(\sim q/p) \ \& \ U(\sim q, p) \rightarrow !\sim q$

This detachment is just possible as long as it has not been *settled* that $\sim p$ is the case, something which may be true at a later time-instance; i.e. at t it is still open whether p or $\sim p$ is the case, but at $t+1$ it may be settled that $\sim p$, i.e. we have $L\sim p$. Accordingly 7a*) will be true at t , while

8a*) $L\sim p \ \& \ O(q/\sim p) \ \& \ U(q, \sim p) \rightarrow !q$

will be true at $t+1$.

It is important to observe that $U(B,A)$ is in itself a modal concept. It is a concept saying that no other facts than the facts present are normatively relevant, i.e. none of the possibly infinite facts present in a possible world at a particular time-instant are such that they *defeat* the obligation considered. This is often called a "ceteris paribus" condition. It is not evident to me how they define truth-conditions for $U(B,A)$, especially since the discussion in Belzer 1987 seems to indicate that the truth-conditions are not defined relative to the facts settled and the normative structure alone. I interpret Belzer's comment on "reasoning with sufficient conditions" (p. 159) as saying that also choice (discretion) may take part in settling the truth of $U(B,A)$. But I cannot see how this may be possible without adapting the formalization to some kind of default reasoning system.

L&B comment that designing 3-D simply to solve the Chisholm paradox would be a case of attempting to kill a flea with a cannon. 3-D is not simply a deontic logic, it has many of the properties of a general practical reasoning system. Belzer 1987 mentions that 3-D is integrated with a system of epistemic logic. Further, the whole system has been implemented in PROLOG. I find 3-D a very interesting attempt at designing and implementing a practical reasoning system, but as a deontic logic it is excessively complicated.

7.5 Representation in Jones & Pörn's system DL

In Jones & Pörn 1985 (J&P) an attempt is made to solve Chisholm's paradox in a way that satisfies criteria (i) to (v) without any representations of time, dyadic deontic statements, or ranking of possible worlds. They do not present any conclusive argument as to why their system is to be preferred to L&B, but one may accept that if they manage to construct an agreeable representation without recourse to time, conditional deontic operators etc., their system may be preferred, using Occam's razor, just because it is simpler and more elegant.

J&P define a system **DL** in which SDL is incorporated. They find the insufficiency of SDL to be due to the fact that the operator *O* only describes what is true in deontically ideal situations; what is the case in situations that are not ideal is beyond the scope of *O*. They therefore define a new operator *O'* in order to express sentences of the form *O'p*, read "*p* is true in every sub-ideal situation". A model in **DL** is a structure

$$M = \langle U, R_o, R_o', V \rangle$$

in which *U* is a class of possible worlds, *V* is a valuation function which assigns a truth-value to each atomic sentence at each world, *R_o* is the accessibility relation between possible worlds as defined in SDL (i.e. being serial and non-reflexive in *U*); *R_o'* is a new accessibility relation, also serial and non-reflexive, defined as:

$uR_o'v$ iff not everything that is ideal in *u* obtains in *v*.

(*v* is a possible world in which something that is ideally the case in *u* is not true; thus *v* could be said to constitute *some* degree of violation of that which ideally is the case in *u*.) Truth-conditions for non-modal operators are defined in the usual way; truth conditions for *O* are as in SDL:

CO $M \models_u Op$ iff $M \models_v p$ for every *v* such that uR_ov .

The truth-condition for O' is obtained by replacing O with O' :

$CO' \quad M \models_u O'p$ iff $M \models_v p$ for every v such that $uRo'v$.

On models in **DL** are imposed the following restrictions:

C1 $Ro \cap Ro' = \emptyset$

C2 $\Delta_U \subseteq Ro \cup Ro'$, where $\Delta_U = \{(u, u) : u \in U\}$

i.e. Δ_U is the diagonal relation on U . C1 state that the two accessibility relations exclude one another, and C2 guarantees that every world in U is either an ideal version of itself or a sub-ideal version of itself. C1 and C2 are the model-theoretic counterparts to the axioms in **DL**:

$OP'Op^* \ \& \ O'\sim p^*$ (where p^* is a propositional constant)

$OO'Op \ \& \ O'p \rightarrow p$

As in SDL we have $DfP P = \sim O \sim$; Pp is true at u iff p is the case at some world which is ideal relative to u . An operator P' is in a similar fashion defined as the dual of O' , i.e.

$DfP' P' = \sim O' \sim$. $P'p$ is true at u iff p is the case at a world which is sub-ideal relative to u .

In DL Op is not, as in SDL, read as "It ought to be the case that p "; instead the concept Ought is defined so as to incorporate a notion of violability:

$DfOught$: $Ought p = Op \ \& \ P' \sim p$.

Rules of proof for Ought are:

REquivOught:
$$\frac{p \leftrightarrow q}{Ought p \leftrightarrow Ought q}$$

RK'Ought:
$$\frac{p_1, p_2, \dots, p_n \rightarrow q}{Ought p_1, Ought p_2, \dots, Ought p_n, P' \sim q \rightarrow Ought q} \quad (n \geq 0)$$

This completes the description of the system DL.

J&P illustrate the expressive power of DL by means of the following sentences:

- DL1) $Ought p$
- DL2) $O Ought p$
- DL3) $O' Ought p$
- DL4) $Ought p \ \& \ P \sim Ought p$
- DL5) $Ought p \ \& \ P' \sim Ought p$
- DL6) $Ought p \ \& \ O Ought p$
- DL7) $Ought p \ \& \ O' Ought p$
- DL8) $Ought p \ \& \ P Ought \sim p$
- DL9) $Ought p \ \& \ P' Ought \sim p$
- DL10) $Ought p \ \& \ O \sim Ought \sim p$
- DL11) $Ought p \ \& \ O' \sim Ought \sim p$
- DL12) $O Ought p \ \& \ O' Ought p$

J&P want to maintain that DL1) express an *actual* obligation; DL2) and DL3) both express *prima facie* obligations; DL2) a maximally ideal obligation; DL3) a maximally sub-ideal obligation. DL4) and DL5) both express actual and *defeasible* obligations; DL6) and DL7) both express actual and *nondefeasible* obligations, defeasible/nondefeasible in ideal situations (DL4 and DL6) or in sub-ideal situations (DL5 and DL7). The conjunction of DL6) and DL7) expresses *absolute nondefeasibility*. DL8) to DL11) express a logically stronger concept of *reversibility/irreversibility*. DL12) expresses the concept of an obligation that holds *unconditionally*.¹⁰⁶

As **DL** has the axiom

$$OO' \quad Op \ \& \ O'p \rightarrow p$$

J&P find it possible to define a concept called "*deontic necessity*"

$$DfN_D \quad N_D p = Op \ \& \ O'p$$

Using this definition, we may represent DL12) as $N_D \text{Ought} p$, which according to J&P is how the concept **Must p** is defined:

$$DfMust \quad Must \ p = N_D \text{Ought} p.$$

By using the concepts $\text{Ought} p$ and N_D as they have been defined in **DL**, J&P are able to give a representation of the Chisholm set that satisfies the criteria (i) to (v):

1b) $\text{Ought} p$

2b) $N_D(p \rightarrow \text{Ought} \sim q)$

3b) $N_D(\sim p \rightarrow \text{Ought} q)$

4b) $\sim p$

The set 1b) to 4b) is (i) consistent; (ii) each sentence 1b) to 4b) is logically independent; (iii) from 1b) and 2b) by a *deontic* detachment we get a *prima facie* obligation $O \text{Ought} \sim q$,

¹⁰⁶ Jones & Pörn 1986: p 92.

and from 3b) and 4b) we may detach the *actual* obligation that Ought_tq. (iv) As was seen from (iii) J&P fully utilise the distinction between *prima facie* and *actual* obligations. They comment on the result that a *prima facie* obligation may be detached from 1b) and 2b) by saying: "This result accommodates, perhaps, an intuition some appear to have had to the effect that, *in some sense or other*, there "exists" an obligation to do [~]q given 1[b]) and 2[b])." (v) 2b) and 3b) are seen as having the same logical form as regards the position of the deontic operators.

Jones 1990¹⁰⁷ also adds two sentences known as "the Belzer extension" of the Chisholm set:

5. If x returns y by date due then x shall be allowed to borrow further books.
6. If disciplinary action is taken against x then x shall not be allowed to borrow further books.

If the representation of the Chisholm set is enriched by representing these sentences as:

5b) $N_D(p \rightarrow \text{Ought } r)$

6b) $N_D(q \rightarrow \text{Ought } \sim r)$

we will again get an inconsistent set. J&P have found that consistency can be restored by representing 1b) as a *prima facie* instead of an *actual* obligation, i.e. by replacing 1b) with

1b*) $O \text{ Ought } p$.

J&P's logic **DL** has as yet not been implemented in any programming language. But there are indications that this is possible. Designs for automatic theorem provers that are able to handle the set of normal modal logics already exist¹⁰⁸. SDL is a normal modal logic of the KD type. The logics for both O and for O' should therefore be possible to implement, and according to

¹⁰⁷ The Belzer extension is also presented in Jones & Pörn 1985.

¹⁰⁸ See for instance Wallen 1987.

Jones, there are indications that the relational properties C1 and C2 do not cause any major obstacle to the implementation. However no one has made the attempt.

Is **DL** the solution to all our problems? I must admit that it took me quite a while to see the elegance of **DL**. The definitions get rather complex. Codd 1989 seems to have shared my problem. He asks how we are to identify expressions like DL1) to DL12) in legislation¹⁰⁹. Jones' answer is that they have never claimed that all of the theoretical distinctions in **DL** between types of obligations are to be found in legislation. I might add that natural language expressions are vague and ambiguous; they do not give sufficient information to determine which expression is correct. What we have to do is to attempt to represent a piece of legislation in a way that satisfies the criteria (i) to (v), and to use the expressions which are most able to satisfy these criteria. When **DL** is compared with 3-D and other logics that strive to give equal expressive richness, we may see the basic simplicity of **DL** in that the whole system is constructed on two basic deontic notions **O** and **O'**, each of them defined in a simple SDL-like logic. No other difficult concepts such as time-relations are involved.

When this much is said it is also worth adding that we would like to see **DL** extended, if possible, so as to give a solution to the problems of consequential closure (J&P's solution to Ross's paradox is a pragmatic solution, concerning how to interpret Ross' statement), and the augmentation problem. (According to Jones, he is engaged in work on how to solve the augmentation problem by introducing "default reasoning" in **DL**.) It is also obvious to me that some of the attractiveness of a system like 3-D is due to the fact that it is more of a dynamic model of the world than **DL**. In 3-D we may simulate historical developments with changing obligations. I agree with J&P that this conceptually should be kept apart from the model of the logical force of the deontic concepts, but none the less we would like a logic program to simulate historical developments. This means that at some point we would like to include a representation of time, action and events into our model.

¹⁰⁹ Codd 1989:p 59.

7.6 Summary on Chisholm's paradox

In short; Chisholm managed to expose a problem pertaining to the representation of sentences qualifying something as obligatory. He describes a situation where it is stated (by 1) and 2)) what is obligatory, (by 3)) what obligations may be detached in a situation that is "contrary to duty" (where what ought to be true is not true), and (by 4)) the fact that the present situation is a contrary to duty situation. Such a situation is easily imagined; it seems present whenever a moral or legal rule is broken and a secondary rule to sanction against such a break exists. When described in natural language, such as in the sentences 1) to 4), it is our intuition that each sentence is logically independent of the other sentences, that it conveys new information not already present in any of the other sentences. It is also our intuition that the set of sentences 1) to 4) describing the situation is consistent. It is our intuition that, if any further consequences of the sentences in the set are detached, consistency should be preserved. Through the attempts to make a representation that satisfy our intuitions the concept of an obligation has been further qualified. It has been found necessary to distinguish between actual and *prima facie* obligations, defeasible and nondefeasible obligations, absolute obligations, conditional obligations etc.

In Jones 1990 Sergot is challenged to describe how his formalization of the library regulations copes with the Chisholm paradox. Sergot has so far not published an answer to this. I will therefore allow myself to discuss what might be an answer. Before I do this I feel obliged to give an extensive description of Sergot's attempt to represent deontic concepts in a logic program formalizing the earlier mentioned library regulations at Imperial College.

8. Representational problems in logic programmes - an example

In this final chapter I wish to discuss the program made by Sergot, formalizing a part of the library regulations of Imperial College. In the first section his program is presented, and certain inaccuracies in the representation are discussed. In the next sections I will discuss Sergot's formalism in relation to Chisholm's paradox.

8.1 Sergot - extensional representation of deontic concepts

The interesting Library Regulations are the following:

LR1. Books should be returned by the date due.

LR2. Borrowers must not exceed their allowance of books on loan at any one time.

LR3. No book will be issued to borrowers who have books overdue for return to the library.

Book Allowances: Undergraduates 6, Postgraduates 10, Academic staff 20.

Sergot suggests making a data base with a representation of facts and rules concerning the allowance to borrow books. To get a picture of how the resulting program operates I will need to describe what is represented fairly extensively¹¹⁰. Information stored in the data base is amongst other things:

Assertions of "borrower status" :

Undergraduate(John)

Postgraduate(Amy)

Staff(Jake)

Librarian(Miss Page)

¹¹⁰ I have avoided using the infix notation used by Sergot for some of the concepts that I found easier to handle with prefix notation. Where infix notation is used, I have underlined the predicate.

Books belonging to the library :

Book(War and Peace)

Book(Confessions of a logic programmer)

Book(Alice in Wonderland)

Records of actions of lending (borrowing) and returning books :

Lent(Miss Page, War and Peace, Amy, 9 July)

Lent(Miss Page, Confessions of.., John, 20 April)

Returned(John, Confessions of.., 21 April)

General rules :

Registered persons

Person(x) **if** Undergraduate(x)

Person(x) **if** Postgraduate(x)

Person(x) **if** Staff(x)

Person(x) **if** Librarian(x)

Book allowances

Allowance(x,6) **if** Undergraduate(x)

Allowance(x,10) **if** Postgraduate(x)

Allowance(x,20) **if** Staff(x)

At-limit(x,t) **if** Allowance(x,n) **and** Number-of-books(x,n,t)

Has(x,y,t) **if** Librarian(z) **and** Lent(z,y,x,t-one) **and**

$t \geq t\text{-one}$ **and not-exists** t' :

(Returned(x,y,t') **and** Between(t',t-one,t))

Overdue(y,t) **if** Due-on(y,t') **and** $t > t'$

Has-a-book-overdue(x,t) **if** Has(x,y,t) **and** Overdue(y,t)

We must assume further rules to define Due-on(y,t'), for instance a rule that adds a number of time instants equivalent to one or two months to the time when the fact that a book has been lent out was recorded in the database. We must also have rule counting what is the number n in Number-of-books(x,n,t).

The **not-exists** operator involves a reliance on negation by failure. This implies a closed world assumption giving the result that (Returned(x,y,t') **and** Between(t',t-one,t)) is true if and

only if the query as to whether $t':(\text{Returned}(x,y,t'))$ **and** $\text{Between}(t',t\text{-one},t)$ has no solution; i.e. that such a t' cannot be proved to be true according to the facts present.

Rules representing modalities :

(The following rules will be given names in parenthesis as I will need to refer to them later.)

In his 1981 articles Sergot doesn't use any modal logic or any semantical theory, specifying truth conditions relative to a set of possible worlds, in order to represent modal concepts such as *possibility*, *prohibition*, *permission* or *obligation*. Instead modal concepts are represented by specifying the extension of the concept. Only when what falls under the extension of the concept obtains is the concept itself satisfied. The modal concept is seen as a kind of abbreviated description of the situation described as the extension of the concept: one simply lists the set of things which are, for example, *possible*, *prohibited*, etc.

Using negation as failure, Sergot suggests that we may represent that it is possible to borrow a book only if person and book are registered and no one else has borrowed the book.

(Pos1): $\text{Possible}(x, \text{borrow}(y), t)$ **if** $\text{Person}(x)$ **and** $\text{Book}(y)$ **and**
not-exists $z: \text{Has}(z, y, t)$

To represent what is effected by the library regulations, Sergot represents two prohibitions (LR(2-3) meaning "Library regulation §2 and §3):

(Pro1): $\text{Prohib}(\text{LR2}, x, \text{borrow}(y), t)$ **if** $\text{At-limit}(x, t)$

(Pro2): $\text{Prohib}(\text{LR3}, x, \text{borrow}(y), t)$ **if** $\text{Has-a-book-overdue}(x, t)$

Permission is expressed by a general rule using negation as failure to express that x is allowed to do y at t if and only if no prohibition can be proved to be in existence; i.e. that the query for a prohibition cannot be satisfied. In other words, the extension of a permission is all that falls outside the scope of any prohibition. (I have rewritten Sergot's rule of permission using prefix notation and the word "permitted" instead of "allowed-to".)

(Per1): Permitted(x,y,t) **if not-exists** z: Prohib(z,x,y,t)

Sergot would like to be able to ask the program whether I “can” borrow a book. He represents “can” as:

(Can1): Can(x,y,t) **if Possible(x,y,t) and Permitted(x,y,t)**

(Can1) makes it possible to ask the database:

Can(Jake, borrow(Alice in Wonderland), today)?

It is easily seen that the answer is NO! if Jake is not a person, or Alice in Wonderland is not a registered book, or someone else has borrowed the book, or if any prohibition against Jake borrowing books is satisfied.

In Sergot’s database there is no distinction between being a person (in the sense of being human) and being registered as a user of the library. The rule (Pos1) characterises a kind of deontic possibility saying that the possibility of borrowing a book is contingent on the borrower’s being registered in the database. If we wanted to distinguish between possibility of borrowing books in an alethic sense and permission as a possibility in a deontic sense, we might want the permission (and not the possibility) to borrow a book to be contingent on the fact that the borrower is registered. We would write:

(Pos1’): Possible(x, borrow(y),t) **if Book(y) and not-exists** z:
Has(z,y,t)

(Per1’): Permitted(x,y,t) **if Person(x) and not-exists** z:
Prohib(z,x,y,t)

Sergot wants the program to be able to answer questions about which obligations there are upon the users of the library. He formulates a representation of the first library regulations in the following way:

(Obl1): Oblig(LR1, x, return(y),t) **if Has(x,y,t) and**
Overdue(y,t)

The conditions for the satisfaction of (OBL1) are the same as for Has-a-book-overdue(x,t). So, if x has a book overdue at time t,

then he has an obligation to return it at time t . But, this is not exactly what was stated in LR1, which says: *Books should be returned by date due*. If what we want is a representation of the obligation stated in LR1, then we need to reformulate the rule to express the idea that x has an obligation to return the book before date due has passed. There is an additional reason to want such a reformulation, since Sergot suggests a supplementary general law to be included stating that:

(Per2) Permitted(x, y, t) if Oblig(z, x, y, t)

As may be seen, this is similar to the axiom schema

OD: $OA \rightarrow PA$

in SDL, and as in SDL (Per2) requires that the set of laws being modelled is consistent, i.e., that the question

Oblig(z, x, y, t) and Prohib(z', x, y, t)?

has no solutions. I suggest that this requirement may be added to the database as what Kowalski (1989) terms an *integrity constraint*. We would express this by adding the following fact to the database:

not (Oblig(z, x, y, t) and Prohib(z', x, y, t))

(Per2) will state a permission to return a book as long as there is an obligation to return the book. But by (Obl1) there is no obligation to return the book before the book is overdue, and we will therefore not have a permission to return the book before after the date the book is due. What we rather would like is to be able to derive the permission to return the book as soon as the book has been borrowed. (Note that a permission to borrow a book may not be derived from (Per2), as there is no obligation to borrow books.)

One way to reformulate (Obl1) would be to write:

(Obl1*): Oblig(LR1, x , return(y), by(t')) if Has(x, y, t) and
Due-on(y, t')

(Obl1*) will be satisfied, and allows (Per2) to be satisfied, once a book has been borrowed, and what is expressed in (Obl1*) is much closer to the actual text of LR1.

But there might still be some problems with this formulation. First, it seems to create the paradox that even when the time is passed t' one has an obligation to return the book by(t'). That means we have an obligation which is impossible to fulfil. This, however, may not necessarily imply that the obligation to return books by date due is no longer true after the date due is passed.

Second, at no time is there an obligation (to actually return the book) of the kind expressed by (Obl1). Only by a further inference from (Obl1*) and the fact that the date is due may we derive an actual obligation, that is an obligation calling for the action of returning the book. In order to make such a detachment we could add the following rule:

(Obl2) Oblig(LR1, x, return(y),t) **if**
 Oblig(LR1, x, return(y), by(t')) **and** $t \geq t'$

(Obl2) states that if x is under the obligation to return book y by t' and the time t is greater than or like t' , then x is under the obligation to return book y at t. (Obl2) adds *factual detachment* to Sergot's representation. (Obl2) has a logical form close to the factual detachment principle in 8a).

If we believe it will make matters clearer, we may express explicitly that having a book overdue is a transgression of LR1, and we may let this transgression be the condition of (Pro2).

(Trg1) Transgressed(LR1,x,t) **if** Has-a-book-overdue(x,t)
 (Pro2) Prohib(LR3, x, borrow(y), t) **if** Transgressed(LR1,x,t)

This is not a substantial alteration; it only makes more explicit the fact that a regulation has been transgressed.

Each of the deontic concepts is defined by giving the concept a specific extension. Each extension describes a set of circumstances. The circumstances change new time instances are added, or because facts are added to, or subtracted from, the database. What is deontically true will change according to the

circumstances. Sergot's representation simply expresses under which circumstances certain deontic notions are satisfiable. For instance:

(Sit1): If the circumstances are that a person (Jake) is registered in the data base as undergraduate, postgraduate or staff, we may derive a permission to borrow books and nothing else.

(Sit2): If the circumstances are that Jake has been lent a book, we may derive that he has an obligation to return the book by date due, and a permission to return the book, and he still has a permission to borrow books.

(Sit3): If Jake has been lent his quota of books so that the number of books is at limit, we may derive a prohibition against borrowing further books according to LR2, and the permission to borrow books is no longer derivable. If he returns at least one book the situation returns to (Sit1) or (Sit2) again.

(Sit4): For each book Jake borrows it is the case that, if Jake doesn't return a book by the date due, and the time has passed the date when the book was due, a transgression of LR1 is derivable. The transgression makes derivable a prohibition according to LR3, and an obligation to return the book. Under these circumstances the permission to borrow books is not derivable, but a permission to return the book is still derivable.

Once Jake returns the book that is overdue the circumstances are again changed to (Sit1) or (Sit2). Then no obligation or permission to return the book, nor a prohibition against borrowing further books, are derivable. Again we may derive a permission to borrow further books.

8.2 Sergot's representation in the light of Chisholm's paradox

To evaluate how Sergot's representation works when confronted with the Chisholm paradox, I will attempt a direct Sergot-style representation of the sentences 1. to 4. in Jones' example. The sentences were:

1. x shall return book y by date due.
2. If x does return book y by date due, then disciplinary action against x shall not be taken.
3. If x does not return book y by date due, then disciplinary action shall be take against x.
4. x does not return book y by date due.

As we are limited by the restrictions given if we use Prolog in the implementation of the formalism, it is not possible to make a positive assertion of a negative fact, nor to use negation in the conclusion (head) of a conditional (rule). We therefore have to represent the sentences in the following way:

- 1c) `Oblig(x, return(y), by(t'))`
- 2c) `Oblig(z, no-sanction(x)) if not-exists t:`
`Has-a-book-overdue(x,t)`
- 3c) `Oblig(z, sanction(x)) if Has-a-book-overdue(x,t)`
- 4c) `Has-a-book-overdue(x,t)`

This representation is consistent.¹¹¹ But in this representation there seems to be a problem concerning logical dependence of the same kind as that which arises in an SDL representation when sentence 2a) is replaced by 2a'). In order to see this, note that the sentences 1c) to 4c) may be seen to have the same logical form as the following sentences in propositional logic:

- 1d) o
- 2d) $\sim p \rightarrow q$
- 3d) $p \rightarrow r$
- 4d) p

¹¹¹ Note that 1c) only states a fact that is unrelated to the other lines. In this representation it is only lines 2c) to 4c) that are of interest.

2d) is logically dependent on 4d). 1d) to 4d) do not preserve the logical independence that our intuition tells us is present in the sentences 1. to 4. It looks as if the same is true of 1c) to 4c), i.e. that 2c) is logically dependent on 4c). If this is true, we will find the same kind of logical dependencies in Sergot's program. As an example: The rule

(Per1): Permitted(x,y,t) **if not-exists** z: Prohib(z,x,y,t)

may be seen as logically dependent on the fact that a prohibition has been proved by (Pro1) or (Pro2). We could make the same argument about the other rules where **not-exists** is used in the condition.

This problem of logical dependence between the sentences in the representation may be seen in two perspectives. First, the problem is that we have introduced in our representation a logical connection between two propositions that was not present in the original natural language text. In the text we do not see any possibility of inferring line 2. from line 4., but this is possible in the representation. The representation is not true to the original meaning of the text on this point.

The other perspective on logical dependence is to see it as part of the paradox of material implication. In propositional notation: Whenever a fact **p** is asserted, any conditional of the form

$\sim p \rightarrow q$

where **q** describes any fact, is deducible. (The consequent of the conditional may even be the false (**q** & $\sim q$).) This is one of the paradoxes of material implication; it is also one of the central motivations behind the search for new detachment principles in deontic logic.

The reason why we have this paradox is that truth-functionally the sentences ($\sim p \rightarrow q$) and (**p or q**) are equivalent. What we have is the tautology: $p \rightarrow (p \text{ or } q)$; that is, we have consequential closure.

In a logic program the paradox of material implication gives the theoretical possibility that a user, not knowing about the

paradox, may ask about the truth of counter-factual conditional sentences, all of which are confirmed as true. If such a query must be represented as a question about whether (p or q) is true, then I assume that this theoretical problem is not a great practical problem, as it appears obvious that (p or q) must be true if p is true. One practical solution suggested to me by Giovanni Sartor (Univ. of Bologna) was to exclude the use of the arrow symbol in queries.

But, apart from such pragmatic ways of preventing uninformed users from getting untenable answers from the computer, we still have the theoretical problem of how to assess the truth of counter-factual statements. The fact that p has been asserted as true makes the statement $\sim p \rightarrow q$ a counter-factual statement. I will not venture to say anything about the logic of counter-factuals; it just appears to me that the Chisholm situation may in part be an example of a more general problem. We often have pairs of conditional statements saying:

$p \rightarrow q$

$\sim p \rightarrow r$

As soon as we assert either p or $\sim p$, one of these statements becomes counter-factual. Suddenly the statement is trivially true due to the fact stated. This must be a general problem for dynamic representations, where new facts are added after the representation has been made.

In a normative context we do not speak about counter-factuals. After Chisholm one talks of "contrary-to-duty imperatives". It may be a quality shared by norms and counter-factual statements that we consider them to be true even if the facts of the situation in a sense make them obsolete. One way to try to express the idea that a norm may be obsolete but still true, is to say that it is a *prima facie* norm. The formal treatment of this distinction between *prima facie* and actual obligations, was, as was seen from the presentation of L&B and J&P, an objective of deontic logic. For the case of deontic reasoning, the inclusion of this distinction in the representation is a way of avoiding the logical dependence in the propositional representation of the Chisholm situation.

8.3 The Reagan-Gorbachev situation

I would like to end this discussion with another example illustrating why a distinction between *prima facie* and actual obligations is needed in deontic reasoning. Consider the variant of Chisholm's paradox found in Belzer 1987: the "Reagan-Gorbachev" situation. Belzer writes:

"Suppose that you were told a secret after promising to comply with these requirements:

- (a) You should not tell the secret to Reagan.
- (b) You should not tell the secret to Gorbachev.
- (c) You should tell Reagan if you tell Gorbachev.
- (d) You should tell Gorbachev if you tell Reagan.

... If for instance you are in circumstances in which it is true that

- (e) You have told the secret to Gorbachev,

then (a) is not applicable. ... Norm (a) is defeasible because of the co-presence of (c). After you have told the secret to Gorbachev you have an a.t.c. [all things considered] commitment expressed by

- (f) You should tell the secret to Reagan.

While (a) and (f) appear to conflict, correct resolution is possible if we recognise that, in the circumstances described, (a) functions as a valid *prima facie* norm, creating *prima facie* commitments, while (f) expresses a valid a.t.c. obligation after it is settled that you have violated norm (b) by telling Gorbachev."

A Sergot-style representation of the sentences (a) to (d) might be the following:

- (a*) Ought(Not-tell(Reagan, secret))
- (b*) Ought(Not-tell(Gorbachev, secret))
- (c*) Ought(Tell(Reagan, secret) **If** Tell(Gorbachev, secret)
- (d*) Ought(Tell(Gorbachev, secret) **If** Tell(Reagan, secret)

If the fact

(e*) Tell(Gorbachev, secret)

is true, then

(f*) Ought(Tell(Reagan, secret))

may be derived. Still (a*) will be true simultaneously with (f*), as there are no conditions to make (a*) unsatisfiable. The lack of negation makes Not-tell and Tell unrelated predicates, and therefore inconsistency is avoided. But, the declarative reading of the conjunction of (a*) and (f*) is clearly paradoxical; the system gives a paradoxical answer.

Belzer makes the point that you would have done something wrong relative to the original story if you replaced (a) and (b) with:

(a') You should not tell Reagan if you do not tell Gorbachev

(b') You should not tell Gorbachev if you do not tell Reagan

because then no norm would be violated if you were to tell both Reagan and Gorbachev.

Sergot has commented that we may add as an integrity constraint

not(Ought(Tell(x,y)) and Ought(Not-tell(x,y)))

But, if my understanding of integrity constraints is correct, this will only block the inference in (c*) so that we are not able to derive Ought(Tell(Reagan, secret)) as long as the fact in (a*) is true. The suggested integrity constraint forces us to make another representation of the Reagan-Gorbachev situation.

To me this suggests the need to develop the representation to at least incorporate the distinction between *prima facie* and *actual* obligations. To Belzer this distinction is the same as the distinction between defeasible obligations and obligations that hold all things considered. The introduction of this distinction in Belzer's system creates a need for a special detachment from a *prima facie* norm to a commitment holding all things considered. As noted in section 4.4 Belzer introduces a modal necessity

operator L , and a modal operator $U(B,A)$, saying that "there is no proposition that holds and defeats $O(B/A)$ "; $O(B/A)$ represents a *prima facie* obligation. By establishing the truth of $U(B,A)$, a detachment from $O(B/A)$ to an actual obligation $!B$ is made possible by the rule:

3d) $O(B/A) \ \& \ LA \ \& \ U(B,A) \rightarrow !B$

Belzer represents (a) to (d) as:

(a#) $O(\sim r/T)$	abbreviated:	$O\sim r$
(b#) $O(\sim g/T)$	"	$O\sim g$
(c#) $O(r/T \ \& \ g)$	"	$O(r/g)$
(d#) $O(g/T \ \& \ r)$	"	$O(g/r)$

where r stands for "You tell the secret to Reagan", g for "You tell the secret to Gorbachev", and T for an arbitrary tautology.

If (e#) g is not settled, then $!\sim r$ holds and can be detached. If (e#) g is settled we may use (3d) to detach $!r$.

If we compare this with J&P's system **DL**, we find that they express something quite different. A consistent representation of the sentences (a) to (e) is given in **DL** by the sentences:

(aDL) $O \text{ Ought } \sim r$
 (bDL) $O \text{ Ought } \sim g$
 (cDL) $N_D(g \rightarrow \text{Ought } r)$
 (dDL) $N_D(r \rightarrow \text{Ought } g)$
 (eDL) g

from which we may derive the actual obligation

(fDL) $\text{Ought } r$

Given that (a) and (b) are *prima facie* obligations, this does not in **DL** entail that (a) and (b) are defeasible. J&P express defeasible obligations by the formulas DL4) and DL5). Even if not *entailed* by (a) and (b), DL4) and DL5) are, however, *compatible* with (aDL) and (bDL). Even the stronger statement

O Ought $\sim$ r & P' Ought r

is compatible with (aDL) (and a similar statement with g instantiated for r is compatible with (bDL)). This expresses a *reversible* obligation, which says that in all deontically ideal situations you ought not to tell Reagan the secret, and that there is also a less than ideal situation in which you ought to tell Reagan the secret. This matches exactly with the normative situation described in (a) to (d).

J&P have not felt the need to include detachment principles to detach actual obligations from prima facie obligations, or nondefeasible obligations from defeasible obligations. But Jones is currently attempting to incorporate default reasoning properties into DL. This attempt will follow Delgrande 1988. If Jones succeeds in this, he may be able to incorporate a distinction between something being obligatory and something being obligatory "all things considered", which is close to Belzer's analysis.

As can be seen both Belzer and J&P are able to give a consistent representation of the Reagan/Gorbachev situation; but in a representation similar to the one suggested in Sergot 1981 we will get paradoxical answers. This demonstrates a need to develop Sergot's representation further to capture one version or another of the distinction between prima facie and actual obligations.

Concluding remarks

As stated in the introduction, two issues have been in focus: first the concept of a norm as presented in the theory of Sundby, and second the issue of formalization of norms.

In the first part of the thesis I have tried to clarify certain questions concerning the relation between deontic logic and more informal studies in legal philosophy. I have done so by questioning the claims made by Sundby that:

1. Normative intensions do not take the semantical values true and false (in Ch. 3.)

2. Deontic logic is an insufficient basis for the discussion of norms because it does not

a) take into account the logic of qualificatory norms, and

b) take into account the distinction between rules and principles (in Ch. 4.)

3. A sense of duty is constitutive of the concept of a norm.

Further, I have tried to fill gaps in Sundby's presentation by pointing to theories about the constituents of communicative acts (in Ch. 2.) and theories analysing the concept of ought (in Ch. 7.).

To be able to give a complete analysis of the concept of a norm as based on the idea that norms are created through enactment, it is necessary to make a thorough analysis of the concept of *competence*. This is not done in this thesis. But it is a task that I hope to be able to pursue in later work.

In the second part of the thesis I have tried to clarify certain questions concerning the relation between works in deontic logic and works on the representation of normative concepts in logic programming. First (in Ch. 6.) I asked whether the criteria for a successful representation were different in the two types of work. I found that there were two criteria emphasised in works on logic programming which are not found in works on deontic logic. First, that the representation should have a close resemblance to the original text as part of a concern about the user friendliness of the program. Second, that the formalization should have a direct practical utility. The last criterion has been used to say that deontic logic is not needed, because a program of practical utility may be made without deontic logic.

Second (in Ch. 7.) I tried to make explicit distinctions which have been made in deontic logic in order to avoid the so called Chisholm paradox. In Ch. 8. I showed that the logic program made by Sergot gets into troubles of logical dependence between the sentences in the program because such distinctions as described in Ch. 7. are not included in the program. The problem of logical dependence was seen to be a very general problem for all dynamic formalisms, where changing facts turn the sentences of the formalism into counter-factual statements. Through the final description of the Reagan-Gorbachev situation, I have shown that within a normative context the problem of counter-factuals is seen as a problem of contrary-to-duty imperatives, which in turn calls for an inclusion of a distinction between prima facie- and actual obligations in the formalism. How this is to be done within the context of a logic program would be an interesting topic for future studies.

HH

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The Norwegian Research Center for Computers and Law has for several years been conducting research in the area of legal knowledge representation, emphasizing analysis of the nature of legal norms, and their representation.

In this thesis – which has been submitted for the degree of magister in philosophy – Henning Herrestad explores the concept of a norm and the formalization of norms. He draws on theories developed in legal philosophy and the theory of legal norms – the discussion will be of interest to the legal philosopher and the legal knowledge engineer alike.



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