

A Description of Common Law as a Moving Classification System

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Abstract of "A Description of Common Law as a Moving Classification
System" by John Henderson

The aim of this thesis is to describe parts of common law in a way that stands as a conceptual underpinning for the formalisms and implementations that are the conventional tasks in AI and law.

The minimum conditions of adequacy for the description are that it must be mechanical, plausible (where plausibility is measured by the number and sophistication of the characteristics of common law explained) and must describe how a decision is made in any case.

The approach adopted is to assume that common law is, as described by Levi [14], *"the most explicit demonstration of the mechanism required for a moving classification system"* and then to analyse common law, on that assumption and using the conventions of formal languages (for example, syntax, semantics, etc).

The result is a description of common law in which the substantive law is, broadly speaking a first order predicate theory. Legal concepts such as negligence and contract are functions in that theory, they are given meaning by an interpretation relation with previously decided cases ('precedents').

The interpretation relation is established by the application of the transformation rule of the system which is the common law rule of precedent and which states that if a new case is similar to a precedent then the law from the precedent should be applied in the new case.

The common law judicial process is the decision procedure of the substantive theory and its purpose is to resolve inconsistencies in sentences of the theory. It achieves this purpose, where possible, by resolving inconsistent sentences or rationalising them at a higher level of generality. Where this is not possible (under the procedure available for the time being) a decision is simply imposed.

Ideas used in related work are incorporated into the description, for example, the decision procedure uses dialogue games to find inconsistencies and argumentation frameworks to regulate those dialogues.

The description is evaluated by its power to explain related work in AI and law and English common law.

The contribution of the thesis is to provide a conceptual description of common law which may be used to assess, explain or develop formalisms and implementations.

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1. Introduction

1.1 Initial Introduction

This thesis sets out a conceptual description of the common law which is intended to stand as a foundation to the formalisms and implementations that are the conventional subject of work in AI and law.

There are two parts to the idea underlying that conceptual description. The first is that legal systems generally can be seen as classification systems whereby the substantive law classifies its domain of application. For example, the substantive common law of negligence defines the class of cases in which one person owes a duty to be careful to another. The system is “moving” because the classification changes with time.

The second is that a legal system represented as classification system consists of a theory (where, following the conventions of formal languages, a theory is a set of sentences in a language) and an interpretation mechanism by which meaning is given to the sentences of that theory. The theory is the substantive law and the interpretation mechanism is whatever it is that gives that theory its meaning as law.

We assert that an interpretation mechanism consists of either reason or authority or a mixture of the two. Under a reason-based interpretation mechanism, a sentence is a member of the substantive theory because it is validly entailed as such. Under an authority based mechanism, a sentence is simply asserted to be a member of the theory of substantive law (crudely, “*it is law because I say so*”).

Under this approach we will describe common law as a legal system with a reason based, two stage interpretation mechanism. The first stage (‘primary interpretation’) is the application of the rule of precedent which states that if a new cases is like a precedent case then the law should be taken from the precedent case and applied to the

new case. The second stage ('secondary interpretation') is the judicial process by which disputes are decided.

Appendix 1 to this thesis is a description of the development of a single case according to the ideas set out in this thesis. It is based on the well known case of *Hedley Byrne v Heller* [11, 12, 13]. It should stand as an example of the ideas in this thesis. In summary, primary interpretation takes place when the claimant analogies its position to a precedent (that is, a previously decided case) in order to justify its self-interest in wanting to assert an entitlement over a defendant. If/when that primary interpretation is not accepted by the defendant, secondary interpretation, the judicial process, begins. The secondary interpretation ends with a decision by the judge as to what the law is.

In the rest of this chapter the motivation for and aim of the thesis are explained (section 1.2), examples of the main problems encountered are given (section 1.3), the need for such a description is explored (sections 1.4 and 1.5) and the description is summarised (section 1.6).

1.2 Motivation and Aim

Original motivation. The original motivation for this thesis was to investigate how to build a program that would be of obvious practical use. Two examples of obvious practical use are an automated legal advisor and a self-regulating framework for computer agents. The idea of an automated legal advisor is a program that would, by reference to a freely accessible database of precedents, such as at www.baillie.co.uk, construct an answer to a question of pure law.

The idea of a self-regulating framework for legal agents is simply that the interactions between computer agents could be regulated by mechanisms similar to those used to regulate social and commercial relations. We will return to these two ideas when we come to evaluate the contribution of this thesis in its final chapter.

This original motivation prompted a search for a conceptual framework against which those programs could be designed and for the knowledge engineering tools needed to construct such programs. The absence of any pre-existing, adequate conceptual framework prompted the investigation which has led to this thesis.

General motivation and aim. This original motivation can be abstracted and generalized into a need for a conceptual explanation of law against which specific implementations and formalisms can be designed.

This thesis aims to take a step towards meeting this need by setting out a description of common law which is:

- (i) mechanical, in the sense that it can be replicated in a machine such as a computer;
- (ii) plausible, where plausibility is measured by the number and sophistication of the characteristics of common law that are explained by the description; and
- (iii) a description of how a decision is reached in every case.

We will take these three statements as the criteria for adequacy of our description. The two main problems encountered in working towards this aim are explaining how law changes and how decisions are made. Some examples of these problems are given in the next section.

1.3 Examples of Change and of Decision Making in the English Common Law

When we look at the law with a view to describing it in a mechanical and plausible way, the two problems immediately appear. First, how is it that the law changes and, secondly, how is it that the judge is able to make a decision in every case that comes before him.

As our description becomes more sophisticated we will explain both these characteristics in terms of theory construction by a process of interpretation. At this stage we will simply summarise some of the ways in which the law appears to change in order to give an initial context to the problems we must overcome. It is more difficult to give an introductory summary of how judicial decisions are made, and therefore, we will illustrate this problem, in this section by reference to the reason based decision procedure in the modern English judicial process.

The example domain used in this thesis is the English common law of obligations and particularly the contractual and non-contractual duty of care. It is convenient to make two introductory points about our example domain at this stage. First, we have not attempted any systematic review of the domain as this would be beyond the scope of this thesis. However, we have tried to take account of the long term development of the domain in our description. Secondly, we treat “common law” (without a definite article or the adjective “English”) as a generic entity as defined by the system analysis set out in Chapter 2. We take the English common law as a specific instance of common law and we will simply overlook the problem that, in reality, English common law is inextricably mixed up with what, on our analysis, are separate legal systems such as legislation and equity (and, indeed, possibly many others).

This section gives two examples, one long term and the other short term, of change in the substantive law of duty of care and two examples, again short and long term, in the change in procedural law.

Long term change in substantive law. The storey of the English common law of obligations over the last several hundred years, that is summarised in chapter 5, is, very broadly speaking, a story of rights and wrongs and the changing demarcation between the two. This summary is based on [4].

The story begins with the early common law in the fourteenth century and continues to unfold today. Under the early English common law there were actions for the

enforcement of contract-type rights (then called covenant) and actions for the remedy of wrongs (then called trespasses). The tort of negligence did not exist.

Actions for the enforcement of contractual rights dwindled. A specific type of trespass called *assumpsit super se* developed to deal with wrongs committed by a party after they had assumed upon themselves an obligation to do something.

Assumpsit subsumed claims for the enforcement of contract-type rights and, under the aegis of *assumpsit*, the concept of a contract was unified by reference to the doctrines of privity and consideration at about the beginning of the seventeenth century.

The rights based concept of contract grew in importance so that, by the beginning of the twentieth century, a judge could say that in the decision in *Derry v Peek* [6], the House of Lords "*restated the old law that, in the absence of contract, an action for negligence cannot be maintained where there is no fraud*" (quoted from Brett LJ's opinion in *LeLievre v Gould* [17]) By about the same time, the concept of *assumpsit* seems to have dwindled and a fundamental reclassification of wrongs, by reference to the concept of negligence, got underway.

In 1932, the modern tort of negligence was unified in *Donoghue v Stevenson* [8] by reference to the doctrine of proximity. In 1962 in *Hedley Byrne v Heller* [13], *assumpsit* was reintroduced as a sub-type of negligence that could exist when one party voluntarily assumed a responsibility to another. A fact noted by Judge Newman in [4], when he said, referring to the decision in *Hedley Byrne*:

"(One cannot help but reflect when words such as "undertakes" and "takes it upon himself" are used whether the law has not gone full circle to "assumpsit super se" – but that is perhaps too academic a topic for a judgment such as this)"

In summary, assumpsit began life as a wrong, gave rise to the unified concept of contract, disappeared and then re-emerged as a sub-type of negligence. Our description of common law must give some sort of explanation of how this can happen.

Medium and short term change in substantive law. We will use four main cases in the development of the modern tort of negligence as examples of the way that a common law concept may change over the short term.

The modern tort of negligence was formulated in *Donoghue v Stevenson* [8], by Lord Atkin. He prefaced and perhaps justified his definition of negligence with the observation that *"the duty which is common to all the cases where liability [for negligence] is established must logically be based upon some element common to the cases where it is found to exist..."*

About forty years later, the test for the existence of negligence was then reformulated by the House of Lords decision in *Anns v London Borough of Merton* [1]. However, the test in *Anns* was then specifically overruled in *Murphy v Brentwood* [20]. Lord Keith said *"I think that it must now be recognized that it [ie, the decision in *Anns*] did not proceed on any basis of principle at all, but constituted a remarkable example of judicial legislation."*

Murphy was followed some years later by *Caparo v Dickman* [3] in which it was held that no element existed that, as Lord Atkin asserted, must logically be common to all cases in which there was a finding of negligence. Lord Oliver stated (albeit with reference to *Hedley Byrne v Heller* [13]) *"although the cases in which the courts have imposed or withheld liability are capable of an approximate categorisation, one looks in vain for some common denominator by which the existence of the essential relationship can be tested. \ \, for my part, I think that it has to be recognised that to search for any single formula which will serve as a general test for liability is to pursue a will-o'-the-wisp"*.

In summary the unified concept was established, reformulated and then at least began to disintegrate in the space of sixty or so years.

Short term change in substantive law can be seen in the three decisions in *Hedley Byrne v Heller* [11, 12, 13]. At first instance, no common law duty was found to exist on the facts. This was affirmed in the Court of Appeal. However, the House of Lords then found the duty. Such a case history is reasonably common in the example domain.

Long term procedural change. Long term procedural change is even more radical and more difficult to summarise, not least because in the early English common law, no distinction was made between substantive and procedural law. The law was defined by forms of action which determined both the procedure used and the type of law concerned.

For the purposes of this thesis, one of the most significant procedural changes is in the mode of trial. In the early English law, an issue was tried by "*An appeal to the supernatural which avoided the risk of error inherent in human judgment*" [4]. The modern English common law decides issues by the judicial process which is a process by which issues that cannot be decided at one level are referred upwards to a level of greater generality (this is explained in much more detail in Chapter 3).

Short term procedural change. The procedural law that we will look at is not limited, as is the substantive law, to any particular subset of that law. Our general idea is that a substantive decision is made by following the procedural rules and, therefore, we may need to refer to a large part of procedural law in order to describe even a limited number of substantive decisions.

It is also an assertion of this thesis that the procedural law changes with time and that procedural change and substantive change are coupled. An example of short term procedural change is a Practice Direction of 1966 [23].

This Practice Direction changed the rules of *stare decisis*. The rules of *stare decisis* specify the extent to which a court is constrained, in reaching a decision, by previous decisions. The general common law rule, assuming a hierarchy of courts, is that a court is bound by the earlier decision of a court which is equal or superior to it in the hierarchy. The Practice Direction, given by the House of Lords, stated that the House of Lords (the highest court in the hierarchy) “*propose ... to modify their present practice and, while treating former decisions of this House as normally binding, to depart from a previous decision when it appears right to so*”. Prior to that Practice Direction the House of Lords had been bound by their own previous decisions.

Without this Practice Direction, the House of Lords, in *Murphy* [20], would not have been able, as a matter of procedure, to expressly overrule the decision in *Anns* [1]. (That is not to say that, if the practice direction had not given them that freedom they would not have found some other way in which to achieve the same result).

As we have said, it is more difficult to give examples of how judicial decisions are made. It is conventional to say that the ratio decidendi of a precedent is the reason *for* the decision (and we will adopt and use that convention). However, this does not tell us *how* the ratio was constructed. For the purposes of this introductory summary, we will refer to one example, albeit an important one, which we will return to in Chapter 3, of how a judicial decision may be made. It is part of the opinion of Oliver J in *Midland Bank v Hett Stubbs and Kemp* [19]. After reviewing authorities going back well over one hundred years, he states “*I find myself faced with what appear to be conflicting lines of authority ... there is at least a conflict between decisions of the Court of Appeal and I must I conceive elect which to follow and if I am not free to elect, I must follow the later decision*”.

This example is particularly interesting because it is the only example we have found in the decisions we have read of a direct conflict between authorities. However, for the purposes of this section, the point to note is that our description needs to explain how

Oliver J arrived at that position and how the methods that he put forward deal with it can be plausibly described.

In the next two sections, we will review some related work in AI and law and in jurisprudence to show that neither of them provide a conceptual description that satisfies our criteria for adequacy.

1.4 AI and Law Does Not Provide an Adequate Conception of Common Law.

Our aim, stated above, is to put forward a description of common law that is mechanical, plausible and describes how decisions are made. In reviewing other work in AI and law, we should expect to find work that is mechanical and, to some extent at least, plausible. Therefore, we will concentrate on the extent to which work in AI and law can explain how a decision is reached by the judicial process. This criterion is prompted by the practical requirements of our original motivation – what practical use is an automated advisor or regulator likely to be if it cannot explain how a decision affecting the agents of the system is made? It will turn out that this is an unfair criterion by which to judge much of the work in AI and law because that work does not address this question. We will treat this as emphasis of the need for the question to be addressed.

There are two main conceptions of the law which underlie work in AI and law, a case based conception and a rule based conception. Under the case based conception, law is represented as a set of precedents. The example of case based reasoning ('CBR') that we will look at in this thesis is Alevén's CATO [1].

Under the rule based conception, law is represented as a set of rules. The example of rule based reasoning that we will use in this thesis is Gordon's Pleadings Game [9].

We will also look at work by Prakken and Sartor [22] which falls somewhere between the two.

CBR has often been used to model parts of common law. The example of CBR that we concentrate on in this paper is Alevén's CATO [1]. The purpose of CATO is to teach a method of arguing with cases. It does not address any of the questions on how decisions are made. Whilst this may seem strange to a practicing common lawyer, it has interesting parallels in the history of the common law. Baker's Introduction to Legal History [4] (a work that will be referred to again and again throughout this thesis) notes [page 93] that "*The Year Book reporters were not usually concerned with the final outcome of a case; how the facts were eventually found, or what judgment was given were facts of no scientific interest to the reader.*"

However, if a CBR system were to be used to make decisions, the problem would arise as to how to resolve a dispute in which there are two equally applicable precedent cases with contradictory outcomes, that is, a dispute in which one of the precedents is in favour of the claimant, the other in favour of the defendant. CATO has a mechanism for arguing that one precedent is more on point than another, but this does not deal with the situations either of there being two equally on point precedents or of there being a dispute about the definition of on pointedness. Ashley and Bruninghaus [5] have developed a case based system, called IBP, which is partly based on CATO and which is designed to predict the outcome of a new case. It is reviewed in Chapter 3. It does not explain how a decision is made in every case.

Rule Based Systems. The rule based system that we will review is Gordon's Pleadings Game [9]. It is perhaps not a typical rule based system in that, in it, the law is represented as defaults of a language of default logic rather than, say, as a set of production rules. However, the difference between the two are not important for our present purposes.

The Pleadings Game is modelled on the old common law exchange of pleadings. The basic purpose of this exchange of pleadings was to identify the issue between the parties and that is the purpose of the main part of the Pleadings Game. There is a final stage that follows the Pleadings Game called the Trial Game in which the issues found by the

Pleadings Game are decided. However, the decision imposed by the Trial Game is an arbitrary one. Any explanation of judicial reasoning of the type found in most important common law decisions is beyond the scope the work.

Prakken and Sartor's work [25] ("P+S" for short) aims to provide an abstract framework in which legal arguments may be assessed. The idea, very generally speaking, is that legal arguments, grounded in rules taken from precedents, are set against each other in a modified argumentation framework. The outcome of the exercise is that the various arguments are classified as justified, defeasible or over-ruled. Justified arguments are those with which a particular dispute can be won. Over-ruled arguments will be defeated by other, stronger arguments and defeasible arguments will leave the dispute undecided either way. P+S does not explain how a dispute consisting of defeasible arguments is decided.

It may be argued in support of these three pieces of work that they can all explain to a certain extent how a decision is made. CBR can explain how a case may be decided by an argument constructed from a precedent assuming the absence of a competing precedent. The Pleadings Game can describe how a decision can be found in cases where there is not any issue between the parties (as might sometimes happen when the court finds that one or other of the disputants has not made out a case). P+S may describe how a decision can be made by a successful argument. However, they will all leave the decision in some hard cases and they will all only be used to analyse a decision after it has been made. In this respect, we will agree with Palmer [19] who states:

"Whilst legal reasoning often has the appearance of inevitability after the fact – after the judgment is given or after the textbook is written – the forward looking process of legal reasoning is one of creative invention. Priority relations are not passively applied by judges, rather they are created by judicial decisions. The corpus juris is an organised chaos of cases, rules and principles with which multiple arguments can be constructed. Some arguments will be clearly available, others may not be. Only more research will tell. Other avenues of argument may seem open but close off as more

possibilities are considered. Which ever way the process goes, the key is to broaden the range of arguments under consideration, not restrict it by imposing abstract priority relationships that may, or may not, hold in any given context. There are no transcendental concepts for assessing arguments, assessment is always dependant upon context and audience. Therefore the basic approach of argumentation frameworks towards argument assessment and pruning branches from the argument tree is unsound."

1.5 Positivist Jurisprudence does not Provide an Adequate Conception of Common Law

The conceptual problems of law are more usually regarded as part of the domain of jurisprudence. The school of jurisprudence that appears to most closely meet our need for a conceptual foundation of common law is positive jurisprudence and so we will look at this in this section.

The claim that common law is a classification system has implications that could be investigated and analysed from a jurisprudential perspective. This is not our aim. We are interested solely in the question of whether or not the positivist conception of law as a system of rules, and particularly that of Hart [11] as modified to take account of the criticisms from the rights-based perspective, provides a conceptual framework for a description that is mechanical and plausible and can be used to describe how decisions are made.

The rest of this section will refer to the three issues that Hart/Dworkin drew attention to that are relevant to our description.

Hart and Dworkin. Hart's conception of the law [11] is of a system of rules. That system contains two types of rules, primary and secondary rules. Primary rules are those that impact directly on their subjects. He puts forward three types of secondary rules, rules of adjudication, rules of change and the rule of recognition.

If primary rules equate to the substantive law and secondary rules equate to the rules of procedure, then our analysis, very broadly speaking, follows Hart in recognising different types of procedural (Hart's secondary) rules, one of which is fundamental. In Hart's conception it is the rule of recognition that is fundamental. In our analysis, it is the rule of precedent that we take to be the fundamental transformation rule of the common law. We will assert in chapter 2 that it is the rule of precedent that is the instantiation of the transformation rule of a moving classification system and that generates the whole of the rest of the system including the procedural and substantive parts.

Hart's rule of recognition states that a primary rule of the system is valid if it is recognised as such by the subjects of the system. It is recognised as valid if it has been internalised by the subjects of the system. Again, very broadly speaking, this thesis follows Hart in so far as it asserts that laws are initially constructed and interpreted by internal processes such as internal dialogues that take place within agents.

Dworkin, in [7], criticised Hart's conception in the area of adjudication by pointing out that it did not explain how cases were decided when they fell through the gaps between the rules of Hart's system and thus began the Hart/Dworkin debate. (Note, in passing the similarity between our criterion for adequacy – an ability to describe how is a decision made – and the grounds on which Dworkin challenged Hart). In very general summary, Hart stated that the judge must use his own discretion to decide such cases. Dworkin and those that followed him argued that the judge must apply rights and principles and that these will always provide the right answer.

This has been developed into a positivist description of judicial decision making which incorporates principles. Here are two examples of the attempt to synthesize rules and principles and anything else that may be found in judicial decisions. First, Sartorius [25] has this to say about how decisions are made:

Any judicial decision takes place against the background of an entire legal system containing a wide variety of interrelated and interdependent decisions, rules, principles, policies, etc. In any case, it may be argued, the obligation of the judge is to reach that decision which coheres best with the total body of authoritative legal standards which he is bound to apply. The correct decision in a given case is that which achieves the best resolution of existing standards in terms of systematic coherence as formally defined, not in terms of optimal desirability as determined by some supreme substantive principle or by the judge's own personal values....The model of justification in terms of institutional coherence explicitly makes relevant the systematic import of a judicial decision as seen against an enormous body of interrelated authoritative standards; before turning to his own scheme of values, the judge would have to be able to justify the claim that, all things considered, there was nothing in this vast body of law which provided a basis for distinguishing one decision as the correct one. Could such a claim ever be justified?..."

Secondly, MacCormack [17], having argued that the judge's decision is made within the context of a "surrounding framework of rules and principles" then goes on to consider which specific principle will apply to the decision in question:

"It follows that not just any principle, but only a principle which is consistent with the existing system, can be accepted as a valid justifying principle of a decision within a system. Of course this means that as a minimum no principle may be asserted which is contradictory to any established and accepted norm of the system, but in practise it means a good deal more as well, as I can best convey in terms of a notion of the overall "coherence" of the system....norms ought to form a broader whole in the broader and admittedly looser sense of embodying the rational pursuit of a consistent set of values.....//...[novel cases] must be decided in accordance with some principle which is not merely acceptable in itself and for its consequences but which is also coherent with and extrapolated from the existing norms of the system. "Rationality, as it presents itself in law, is always a form of continuity" "

There is an interesting similarity between Sartorius' and MacCormack's descriptions of 'institutional coherence' and 'coherence', respectively, and the description of legal reasoning from the period of the English Common Law Year Books by Baker [4, page 104], as follows:

"...argument never turned in the Year Book period, as it does now, on what a particular judge meant on a previous occasion or whether he reviewed the authorities correctly. What mattered was the "reason of the law", which was found in the whole body of legal learning and transcended isolated instances."

Whilst it might be argued that these attempts at a synthesis of the Hart and Dworkin positions meet one of our tests for an adequate conception of the law – they might describe how any new case is to be decided - they would probably not satisfy our other two criteria for adequacy. Their plausibility is questionable insofar as we have not found specific examples of the situations described in the precedents reviewed from the example domain. It is difficult to see how they could be replicated in a purely mechanical way.

We will now look at three of the characteristics of the common law that have had attention focused on them by the Hart/Dworkin debate and which help explain our description.

Values and principles. Dworkin points out that judges resort to principles in order to decide hard cases. We will accept this, however, under our analysis, those principles are not part of the common law system, they are part of some other legal system, perhaps legislative, perhaps equitable, perhaps some other system. The modern English law is a mixture of various different systems and there are examples of judges mixing those different systems in a single opinion.

Our analysis separates out the various competing systems and makes distinctions, based on their interpretation method, between them. Under this analysis, a common law

system is based on interpretation by reference to precedent by a two-stage mechanism. A legislative system is based on interpretation by political authority. An equitable system is, like the common law, based on a two-stage precedent based interpretation. However, the position from which the second stage is carried out is different from that used in a common law system. In a common law system, that second stage, that is, the judicial process is carried out from the position of the "reasonable man". That is an objective view point which does not take specific account of the individual circumstances of the disputants. In the system of equity, the second stage is also the judicial process, however, it is carried out from a position which takes specific notice of the positions of the disputants, it considers the "fairness" of the subjective situation between them.

We accept that this is an idealization of reality, but it does give us a powerful tool with which to analyse legal systems. One of the products of this analysis is that value based reasoning or principle based reasoning are not part of a common law system.

Judicial Discretion. Part of the Hart/Dworkin debate centered on the nature of judicial discretion. Hart and his followers argued that at times the judge had to exercise strong discretion, that is discretion that was not in any way fettered by guidance on how it should be exercised. In exercising strong discretion, a judge is completely free to choose whichever decision the judge happens to prefer. Dworkin argued that judges only ever exercise weak discretion in that their discretion is always constrained by the application of rights and principles.

This thesis does not describe common law from this perspective and, therefore, does not need to choose between the two. We will characterize all common law decisions as a matter of either reason or of authority or of a mixture of the two. A decision by reason is an interpretation grounded on one or more precedents (the precedent is the reason for the law). A decision by reason is simply the conclusion of an argument which has as its premises, the reasons for the decision. A decision by authority is an interpretation that is imposed by authority.

We accept that there may be a mixture of reason and authority based decisions at all levels of the system.

Reason and authority may be further described as being either legal, in which case they are of a type recognized by a legal system or arbitrary in which case they are not. A judge may reach a decision by an arbitrary reason (which would then become incorporated into a common law system by the operation of precedent) or by judicial authority, as illustrated by the quotation from Oliver J's opinion in *Midland Bank v Hett Stubbs and Kemp* [19] set out above.

Hard cases and clear cases. The Hart/Dworkin debate led to a distinction between hard cases and clear cases.

In our description, hard cases are, broadly speaking, those that are at or near the boundary of the classes of the classification system. Clear cases are those that are near the centre of the classes, they are those about which there would be no dispute and which would never find their way to court.

However, because the classification changes, cases that were hard might become clear and vice versa and secondly, because it is only by operation of the system that cases show themselves as hard, it is not possible under our description to say in advance of the operation of the system which cases are hard and which cases are clear.

Our analysis suggests that there are three types of hard cases:

- those concerned with the existence of a particular legal concept (*Donoghue v Stevenson* [8] and *Hedley Byrne* [13] are examples of this type);
- those concerned with the application of a legal concept which is agreed to exist (*Derry v Peek* [6] is an example of this type); and

those concerned with the competing application of two inconsistent concepts (Midland Bank v Hett Stubbs and Kemp [19] and Henderson v Merrett [14] are examples of this type).

We will refer to these three types of hard case later in this thesis.

1.6 A Summary of the Description and the Organisation of this Thesis

1.6.1 Introduction

This section gives a summary of the main parts of our description whilst at the same time, describing the lay out of the rest of this thesis.

The description and the lay out of the thesis are based on a system analysis (described in chapter 2) under which the substantive common law is a theory and the judicial process is a proof theory of that theory. The theory is described in chapter 2, the proof theory (which we will refer to as the decision procedure) in chapter 3. Chapter 4 reviews related work in AI and law and our earlier work. Chapter 5 contains a description of parts of the English common law and chapter 6 evaluates the description and seeks to justify its contribution. We will consider the contents of each of the chapters in more detail.

The purpose of this section is not only to summarise the main characteristics of the description and how it is presented in this thesis, but also to give an over all perspective of the description. The individual chapters each concentrate on one particular part of the description, we will use this summary to show how the parts fit together as a whole.

6.2 An Informal System – Chapter 2

Chapter 2 presents a system analysis of common law by reference to the conventional parts, together with some additions, of a formal language. Before summarising the system analysis, we will say something about the description as an informal system.

Our moving classification system is informal in two senses, first, in contrast to formal systems. A formal system is one in which all parts of the system are completely specified, a moving system cannot be completely specified as that would limit the extent to which the parts that were specified could continue to change. We will also find that important parts of the English common law such as the transformation rule and the statements of the system theory are inherently vague and therefore resist attempts at complete definition. The transformation rule asserts that like cases should be classified together, but there is no fixed definition of 'like'. The main building block of the substantive theory is the legal concept, there will always be some uncertainty as to the scope of a particular legal concept.

The second way in which the system is informal is in the old sense of the word 'inform' – meaning 'to give form to or impart a quality to'. The operation of the system gives form to its domain of application by classifying it in accordance with concepts that it constructs for the purpose of classification.

The system analysis. Under the system analysis in chapter 2:

- the substantive law is a theory, that is a set of sentences of a language. The language of the English common law is everyday English;
- the rule of precedent is the transformation rule of the system;
- the semantics of the substantive theory are based on an interpretation which relates legal statements to precedents and then tests and, if necessary, reformulates the interpretation and asserts by authority that it is generally applicable in the community of agents;

- the judicial process is the proof theory of law and is the process of secondary interpretation; and
- the substantive legal theory is used to classify the domain of social relations between agents;

The main focus of this thesis is on primary interpretation and on the decision procedure of the judicial process. The other parts of the analysis are sketched in to give background and support to two main areas of study.

The substantive legal theory. This consists of functions and predicates. A function is a statement that defines a legal concept such as a duty of care which is, broadly speaking, as defined in *Donoghue v Stevenson* [8] an obligation to avoid harming your neighbour. A predicate is some sort of relation between functions. Predicates are remarkably few in our example domain, however, in the statement that common law duty and contractual duty can apply concurrently, the property or quality of concurrent application is the predicate.

The sentences of the substantiation theory are supported by other linguistic structures, a case being the obvious example.

In a precedent from the English common law, it is the statement of law that decides the case. This statement is often only very short or perhaps not present at all. It is this statements that is a member of the substantive legal theory. The whole of the rest of the decision, including all the rest of the ratio (which is the part that explains how the legal statement is constructed), is not part of the substantive theory, although it might be relevant to it and although it might be described as a set of sentences of a much wider theory.

The semantics of the substantive theory is normative in the conventional sense that it contains 'ought' statements as distinct from 'is' statements (which are often referred to as propositions in work on formal propositional systems). The sentences of the theory

are given their semantics by a process of interpretation which is carried out by the application of the transformation rule and the decision procedure (summarised below).

Our intuitive idea of common law is of a collection of legal concepts that are constructed and reconstructed by the repeated comparison of precedents with new cases and with each other. The concepts are related to each other and the process of case comparison also leads to the nesting of concepts and to orderings between concepts that are expressed in the predicates of the language.

Transformation Rule. There is a single transformation rule for the system which is that if one case is like another, then the first case should be treated similarly to the second. This is developed straight from Levi [14] and the rule of precedent – it states that if the facts of a new case are similar to the facts of a precedent case, then construct a rule from the precedent case and apply it to the new case.

The intuitive idea of the transformation rule is illustrated by contrasting it with the rules of natural inference (such as modus ponens and modus tollens) which play an equivalent role in a classical formal propositional system to that played by the rule of precedent in the common law. The most important characteristic of the rules of natural inference is that they are truth preserving so that we know, following their application, that if our premises are true, then our conclusion must be true. The conclusion can be said to always have been a theorem of the language, to have always existed in that language. There are no equivalent notions to truth or truth preservation in our system. The application of the transformation rule may construct new concepts and theories that cannot meaningfully be said to have always existed in the system.

Interpretation. As mentioned above, the sentences of the substantive theory are given their meaning by a process of interpretation. Interpretation is carried out in two stages. Primary interpretation is carried out by the application of the transformation rule which establishes a relation (the relation of interpretation) between a sentence and a precedent. If the transformation rule is successfully applied the key attributes of the precedent case

(that is the attributes that are taken to explain why the case was decided one way or the other) are taken to be the argument of the function and the value is some name given to the concept. Secondary interpretation is carried out by the primary interpretation being subject to the judicial process, that is by the case going to litigation.

In describing our system analysis, we will develop the idea of a community of agents in which the legal system subsists. From the perspective of the community of agents, primary interpretation is a private action of an individual agent, secondary interpretation is a public action which makes the legal statement in question apply to the whole community of agents.

1.6.3 The Decision Procedure – Chapter 3

We will refer to the decision procedure as described in this thesis as the rational trial, the general idea being that a common law decision procedure should be, so far as possible, reason based rather than authority based.

What we are describing is the judicial process. Under a process based description of a legal system, it is the decision procedure of that system. Under a semantics based approach, it is the process of secondary interpretation by which some sentence of the substantive theory is publicly declared to be the law that applies to the community of agents.

In this description, the rational trial is built up from two parts, a dialogue and a decision mechanism. We will summarise these two parts separately in this section.

The dialogue used in the rational trial is called the regulated dialogue, the idea being that the dialogue is regulated by the rules of procedure and a judge who takes an objective, “reasonable” position.

The regulated dialogue has two stages and if the dispute is not rationalized by one or other of those two stages, then a decision mechanism is applied to it in order to bring that dispute to an end.

The two stages of the regulated dialogue are the difference dialogue and the issue dialogue. A difference, as the word suggests, is a difference of primary interpretation between agents that is not necessarily contradictory. If the two positions of the agents can be resolved together into a single sentence of the theory, then the dispute has been resolved. If this cannot be done then the difference becomes an issue between the disputants and must be referred to a higher procedural level to be dealt with, this is the level of the issue dialogue.

The issue dialogue takes place at a more general procedural level than the difference dialogue, the idea being that if a difference cannot be resolved at one level, then it may be rationalized at a more general level. This is to say, from the perspective of the community of agents, if the difference cannot be resolved at a private level, it must be referred upwards to the public level.

If the issue dialogue can find a rationalization, the dispute comes to an end. If it cannot, then the dispute can only be brought to an end by the imposition of the decision mechanism which guillotines the dispute by deciding it in favour of one party or the other.

The regulated dialogue is controlled by the application of various procedural rules and, in accordance with our criterion for adequacy that the description must be mechanical, by the use of cycles in an argumentation framework. The general idea here is that the argument moves put forward in the regulated dialogue are recorded in an argumentation framework that is constructed as the dialogue is conducted. This will show when there is a cycle of arguments between the disputants, the most obvious example being when there are two arguments that mutually attack each other. We treat the existence of a cycle of arguments as a deadlock between the parties which causes the dispute to be

referred to a higher level (if there is one) or for the decision mechanism to be applied to guillotine the dispute (if there is no higher level).

A decision mechanism is any mechanism by which a deadlocked dialogue is brought to an end. We have quoted two examples given by Oliver J in *Midland Bank v Hettys Stubbs & Kemp* [19] above. We have said that interpretation mechanisms may be either reason based or authority based. We will describe the decision mechanism in the rational trial using these concepts. When we do so, it shows that there is a spectrum of decision mechanisms ranging from the procrustean to the logical. The procrustean procedure is pure authority and would lead to the same decision being imposed in every case, whatever its content. The logical is a pure reason based mechanism which would leave any cases that were not axiomatically decided, forever undecided. However, this is only the analytical description. What we see when we look at the English common law is that reason and authority appear to be mixed and to play off each other in the sense that one forms an exception to the other. We will follow this example from reality in the rational trial. Since the whole idea of the rational trial is that it is reason based, the decision mechanism is purely authority based. That is, a decision is simply imposed by the judge if his own internal regulated dialogue, conducted from the perspective of the reasonable agent reaches deadlock (that is, falls into a cycle). This broadly reflects the way in which, historically, equity has been used to alleviate the rigour of the common law.

1.6.4 Related and Earlier Work – Chapter 4.

Chapter 4 describes related work and our earlier work and requires far less introduction than the main ideas of chapters 2 and 3.

The related work that we look at is Aleven's CATO [1] which we take to be the most fully developed example of a CBR system, Gordon's Pleadings Game [9] which we take to be a good example of a dialogue game and an example of a rule based system and Prakken and Sartor's model for reasoning with precedents [22] which is an attempt to

use ideas from argumentation to resolve together reasoning with cases and rule based reasoning. We also look at work on value based reasoning by Sartor and Bench-Capon [24] and others.

This related work is all at a predominantly engineering level rather than at a conceptual level. We will look at it predominantly at a conceptual level and find that CBR is a model of a theory and transformation rule without a decision procedure and bears an interesting similarity to the early English common law procedure. The Pleadings Game is a mix of ideas from the old and the modern common law and that Prakken and Sartor's work is a logicist conception.

Our earlier work focused on developing a mechanism which could stand as an implementation of the transformation rule of the system. This is how it is described in this chapter. The mechanism was developed long before the overall description set out in this thesis was worked out, but it fits into that description well.

1.6.5 The Description and Conclusions – Chapters 5 and 6.

Chapter 5 contains the description of some parts of the English common law based on the description set out in chapters 2 and 3 and chapter 6 is the conclusion of the thesis.

Examples of the common law, in chapter 5, are given both on the micro-scale of an individual decision and on a macro-scale. On the micro-scale, we will analyse part of one of the opinions from the House of Lord's Judgment in Hedley Byrne [13]. It is shown to be what we will describe as an internal issue dialogue conducted by the judge.

On a macro-scale, the long sweep of the history of the common law from its origins in communal and customary law to the present day is considered. This part of the analysis is necessarily superficial, but it provides a broad view on the development over time of both procedural and substantive English common law as a classification system over time.

The rest of this section will set out a general summary description of the wider modern English law which is implied by the analysis used in this thesis. We assert that the modern English law is a mix of many systems. In this thesis, as a simplification, we will only refer to what we take to be the three dominant systems, common law, legislation and equity.

We will treat the common law, legislation and equity as being three separate systems (in that, at least initially, they all have different methods of giving interpretation to their statements and they all have different decision procedures) and we will ignore the fact that they may all have developed from a common parent system. We will use the idea of public and private actions in the community of agents as the key by which to classify the different methods of interpretation.

The primary interpretation of common law is the relationship between a legal sentence to one or more precedents, secondary interpretation is the judicial process. Primary interpretation is a private action of an agent. Secondary interpretation is a public action of the community of agents.

The primary interpretation of legislation is the intention of the legislature when they enact a bill into law, secondary interpretation is the act of the legislature in enacting legislation. It is an authority based mechanism. The primary stage is "private" to a group of agents, such as a political party or interest group. The second stage is public.

The primary interpretation of equity is an authority based private assertion of rights. Secondary interpretation is a judicial process based on the subjective position of the disputants (as distinct from common law where the judicial process is based on the objective position of "the reasonable man").

Finally, chapter 6 evaluates the description by examining the extent to which there is mutual corroboration between the description and the concepts that underlie the related

work that was reviewed in chapter 4, by its ability to explain the common law as described in chapter 5 and by its compatibility with received ideas.

1.6.6 Some Limits on the Description.

Finally in this chapter, having summarised what this description does contain, it is appropriate to mention some of the limits on it.

At the outset of this enquiry, its scope was limited in three ways, first, it was only to be concerned with questions of law as distinct from questions of fact or of fact and law, secondly, it was only to be concerned with judge made law and not with statutory law and, thirdly, the example domain was limited to the rule of negligent misstatement as set down in *Hedley Byrne* [13]. Intuitively, these as three constraints looked reasonably uncontentious. During the course of the enquiry, as the description developed, the assumptions began to look less appropriate and were, in some cases, left behind or revised. It is helpful to an understanding of the description to review the three assumptions in light of the fully developed description.

First, the assumption that we are only concerned with questions of pure law, not with questions of fact and that we can meaningfully limit the enquiry in this way. The initial assumption was that we would treat the common law as a system and the world of facts as an arbitrary and external environment of that system

The type of questions, answered by the common law, that this paper is concerned with is limited to questions of pure substantive law of the sort that typically arise in hard cases, such as, 'does a tortious duty of care exist?' and 'has the duty of care been breached?'. It is not concerned with how the common law answers questions of fact such as, 'did the defendant give to the claimant a financial reference in respect of a third party?', and 'did the defendant check the financial standing of that third party before giving that reference?'

This distinction is difficult to maintain for at least four reasons. First, the distinction between law and fact only becomes acute in the judicial process, whereas we will see that this is only the secondary interpretation for the system and that much of the operation of the system takes place without this stage ever being reached.

Secondly, it assumes that there is a discrete and free standing body of common law (that is, a substantive theory) that is the concern of questions of pure law. This assumption is not supported by the transformation rule of the system and by our constructivist approach which asserts that the law is in fact constructed and reconstructed during the process, rather than sitting in some database ready to be applied as and when their antecedent matches the facts of the case under consideration.

Thirdly, the common law and its environment are coupled so that the operation of the common law arbitrary matters can refine and redefine some of the non-legal concepts. Fourthly, the facts of a particular precedent are likely to be interpreted into 'factors' (that is, legally relevant facts) and then reinterpreted as during the operation of the system.

The second assumption was that we are only concerned with judge made law as distinct from statutory law. However, the analysis in Chapter 2 undercuts that distinction. First, it suggests that any public, authority based legal statement with prospective (as distinct from retrospective) application may be described as legislation, whether it be by a legislature or by a judge. We have already seen the decision in *Anns v London Borough of Merton* [1] as having been described as an example of judicial legislation (see above).

The third initial assumption was that the example domain could be limited to one doctrine of the modern English common law, being the modern law of negligent misstatement. This doctrine appeared to be a promising one in which to investigate the way that the common law changes, it is 'living' in so far as it continues to develop and is purely judge made. However, it almost immediately proved to be too limited in that considering only one doctrine did not allow the relationship with another, such as general negligence or contract to be considered. It could not provide examples of the

extraordinary way in which a common law concept appears to start life with one interpretation and then develop to mean the opposite and it could not take account of the development of the transformation rule from the old common law to the modern. Therefore, we have been forced to abandon a focused example domain and, whilst continuing to return to negligent misstatement, we have taken examples from a much wider and therefore possibly more superficial range of legal history.

This chapter has introduced the description presented in this thesis. Next, chapter 2 will set out the substance of the description.

2. The System Analysis and the Substantive Legal Theory

2.1 Introduction

The description of the system is split into two parts, the decision procedure being one part which will be described in chapter 3; all the rest of the system being the other which is described in this chapter, together with the analysis by which law is separated out into these parts.

2.2 The System Analysis

2.2.1 Introduction

This section sets out the system analysis that underlines the description.

The approach used in the system analysis is to assume a mapping between parts of the common law and parts of a formal language.

The approach used in the system analysis is pragmatic. No attempt has been made to be rigorous and systematic. We do not assert that common law is a formal language, but have simply been motivated to carry out the system analysis in order to meet the needs of the description. The description needs to be underpinned by a conceptual analysis and the system analysis was designed to meet this requirement, not the other way around. To this extent, it is something of a rational reconstruction.

Further, we have been free to adopt into the system analysis concepts that we needed in order to develop the description, but which may not normally fall to be considered at the same time as formal systems, the obvious examples are the concepts of authority and reason.

The result of the system analysis is a description of common law as a language-based system consisting of three main elements: a substantive legal theory, an interpretation mechanism to give meaning to the sentences of that theory and a

decision procedure to decide whether or not a particular sentence is a valid sentence of that theory. In respect of the modern English common law, the legal theory is the substantive common law, the interpretation mechanism is the rule of precedent and the decision procedure is the judicial process.

The rest of this section is arranged as follows. Section 2.2.2 sets out the system analysis. Section 2.2.3 describes the description as a product of the system analysis and Section 2.2.4 describes some of the main elements of this description in terms of the system analysis.

2.2.2 The System Analysis

Language and agents. The System Analysis takes as its starting point the existence of some agents and a language.

The language is arbitrary in the sense that it is not necessarily used in any legal context. It is used by the agents in a non-legal way. We assume that the language has some semantics and syntax and that a set of sentences of the language is a theory. For example, the natural language, English is the arbitrary language of most if not all common law jurisdictions. The English language contains concepts such as 'duty' and 'fraud' which can be used in a non-legal (we would say, arbitrary) way.

The arbitrary language may be described as the object level language insofar as it is the language to which the legal system applies.

The agents are assumed to either software agents or humans. They bring with them three elements: a domain, some processes and an interpretation mechanism.

The domain is whatever it is that the words and sentences of the arbitrary language refer to. We will say that the domain of the legal language is social relations between agents.

The processes are ways in which the agents interact with each other. In this thesis, we are mainly concerned with one process, dialogue which we take to be an

interaction between the “positions” of two agents (or two groups of agents). (Agents’ positions are described in more detail below).

We treat processes as fundamental and separate from language in that there may be non-verbal processes, such as a fight, between agents. However, nothing turns on this for the purpose of this thesis. The other process that at least gets a mention in this thesis is dialectic. We take dialectic to be a series of questions and answers between agents.

An interpretation mechanism is a way in which agents give or construct meanings for the words and sentences of their languages. We assume that there are arbitrary interpretation mechanisms that give meaning to the arbitrary language. We are not concerned with these.

We assume that there are two types of interpretation mechanisms in legal systems, these are mechanisms of reason and of authority. In a reason-based mechanism the interpretation is the product of an argument. In an authority-based mechanism the interpretation is asserted.

Underwood Lewis on an essay on Coke’s theory of the common law as reason [28], describes the role of reason and authority in the common law as follows.

“...in the history of jurisprudence since the thirteenth century, thinking about the nature of law has polarized around two basically incompatible points of view... According to the first, law is portrayed as an act of will that derives its binding force from the threat of sanction [broadly speaking, this is what we will describe as authority]; in the other it is held to be a rational ordinance or directive judgment, commanding obedience to itself primarily because what it directs the citizen to do is reasonable and in that sense just.

In our description of common law there is a two stage interpretation mechanism. The first stage, primary interpretation, is the way in which legal meaning is first given to a word or sentence of the legal language. The second stage, “secondary

interpretation”, is the way in which the primary interpretation is tested and possibly re-interpreted.

Our definition of common law is based on the types of primary and secondary interpretation that are used in common law. We say that in common law the primary and secondary interpretation are reason based. Reason in the primary interpretation comes from the application of the rule of precedent. Reason in secondary interpretation comes from the reasonable positions adopted by the judge.

Our assertion that the primary interpretation by the application of the rule of precedent is a reason based mechanism was suggested by Underwood Lewis' statement [26] that “*Coke's definition of law* [as “perfect reason, which commands those things that are proper and necessary and which prohibits contrary things”] *was able to serve as the technical instrument for building a system of stare decisis*”. His general argument being that Coke used the rule of precedent to “*provide a principle that could give English law an internal consistency.*”

Using the idea of reason and authority based interpretation, it is easy to differentiate a common law legal system from a legislative legal system and from an equity based legal system. For example, in a legislative legal system the interpretation mechanism is authority based, that is the will of the legislative. In equity based systems the secondary interpretation carried out by the judicial process is based on the subjective positions of the disputants rather than the objective position of the “reasonable man”.

We can immediately make two observations on common law as analysed by this approach.

First, the modern English law is far from a pure legal system. It embraces elements of other systems, for example judges legislate, the judicial procedure is codified by legislation and matters of common law and equity are may be tried together. Therefore, this description is very much an idealisation.

The second point is that, within the definition of common law, defined by its primary interpretation mechanism, we will see that the system itself changes with time. This

is clearly seen in the development from the early common law to the modern common law, as summarised in Chapter 5.

To summarise: a legal system operates in the context of a set of agents who have a language L , and who interact through a number of processes, including dialogue. Agents attach meaning to sentences of the language by interpretation, by reason, which may involve the application of a transformation rule which extends or revises the meaning of an existing concept, or by authoritative statement of the meaning of the concept. There are two stages in the interpretation procedure. Primary interpretation is the private act of the individual agent. Secondary interpretation is the public act by which an interpretation is adopted by the community of agents as a whole. Secondary interpretation requires that this new or extended meaning be accommodated with existing meanings represented by the current theory, either by reason or by authoritative choice. The theory describes, among other things, social relationships between agents. A legal system may be characterised by its means of interpretation: common law, which is the focus of this dissertation, uses the rule of precedent as its transformation rule, and an objective, reason based judicial process as its secondary interpretation.

2.2.3 The Description as a Product of the System Analysis

In the context of our analysis, this description consists of three main elements, the legal substantive theory, primary interpretation and a decision procedure. We will say something about each of these with respect to how they should be viewed as a product of the analysis. We will then make some comments on specific parts of our description, being arguments, relations between the positions of agents and the domain.

The legal theory. The substantive legal theory is a set of sentences constructed from the syntactic elements of the arbitrary language. A case structure is perhaps the most obvious example. These syntactic elements are covered in section 2.3 below. Here, we will comment on four elements of the language that might be used in the theory or to make statements about the theory, particularly as they are elements that

are commonly used in other work and on AI and law. They are rules, factors, theories and issues.

Rules. New common law sentences are the product of the application of the transformation rule. As explained below, this has retrospective rather than prospective application and it does not produce rules. We will take rules to be sentences that have prospective application and which have the structure "IF *antecedent* THEN *consequent*". The product of the transformation rule is an indicative sentence that can be seen as a summary of past experience, which may or may not continue to apply to future cases.

The application of the rule of precedent produces, in the terminology of formal languages, functions and predicates. We will not treat these as rules. It is important to emphasise this because it challenges the widely held assumption that law is a system of rules and it is easy to confuse the representation of common law sentences as rules and give them prospective application without explicitly recognising that a further interpretative step has thereby been taken.

Factors. We take the definition of factors from CATO [1 – see Chapter 4] as legally relevant facts. They are not in themselves sentences of the legal theory (although they may become so if incorporated into a common law function or predicate). This should be intuitively obvious from the characteristics of the *ratio decidendi* of a precedent. The *ratio* states the reason for a decision and may refer to various factors. It leads up to the decision itself, which may be a sentence of the common law, but which does not include all the factors.

Theory. We have defined a theory as a set of sentences of a language. A legal theory is a set of sentences produced by a legal system, that is, in respect of common law, initially constructed by the rule of precedent and then tested by the judicial process. However, we shall also assert that a theory may have additional structure by which the sentences it contains are organised or ordered in some way. An obvious example of this is the organisation of the modern common law substantive theory of obligations into contract and tort and the organisation of the theory of tort into

different classes such as nuisance, trespass and deceit. These are sub-theories within a structured theory.

Issues. Under our system analysis, issues are inconsistent statements in the legal theory. The main point to note here is that since, as described below, the competing interpretations from which an issue arises, may only be partial, and therefore, in contrast to inconsistencies in formal languages, an issue should not necessarily be taken to be an absolute contradiction. We will assume a range of issues with a difference at one end (differences are defined in Chapter 3) and a direct contradiction at the other.

Primary Interpretation. In this description, the primary interpretation is by application of the rule of precedent which says that, if a new case is like a precedent, then the law in the precedent should be applied into the new case. The general idea is that the interpretation of a law sentence is constructed by being linked to a precedent in which it has been used.

As we have said, under the system analysis, this is a reason based interpretation mechanism. It is explained in more detail in section 2.4, below. We will make four points in respect of primary interpretation here.

First, whilst, as a result of the system analysis, primary interpretation is treated separately from the judicial process, it is clear from the case law referred to that it is also applied during the judicial process (see the digest of *Derry v Peek* [6] in section 2.4 below and the quote from *Cann & Willson* [2] in Chapter 4 for examples).

Second, we emphasise the difference between the use of the word "interpretation" in formal systems and its use in this analysis. The word has the same basic sense in both, in that it is a relation between a formula of a language and some model by which that formula is given a semantic value. However, in formal systems, interpretation is usually assumed to be a binary condition – a formula is either interpreted (in which case it is a sentence) or it is not. Under our analysis, interpretation might be described, in contrast, as analogue. There is a range of states of interpretation from a minimum in which, say, only one single agent from the

entire community of agents has constructed a particular primary interpretation, to a maximum state where all agents of the community accept a particular primary interpretation. Thus in our sense it is possible for several varying interpretations to coexist.

Third, other systems may give interpretation to sentences of law by relating them to things other than precedents. For example, legislation (that is, rule-based prospective sentences produced by an authority based system) may be interpreted by relation to values or social policy, rather than precedents.

Fourth, it is the structure of the rule of precedent that causes common law to be a classification system. The application of the transformation rule causes two cases to be classified as either similar to or different from each other.

The Judicial Process. Under the system analysis, the judicial process is the decision procedure of common law and the method of secondary interpretation by which sentences with a primary interpretation may be tested and re-interpreted. This thesis pays most attention to the judicial process, which is the subject of chapter 3. Here, it is convenient to make only one point about the judicial process, which concerns the extent to which it is a mixture of systems. In carrying out the system analysis, we have separated out interpretation into primary and secondary stages, we have made a distinction between reason and authority and we have separated law out into different systems. In operation, the judicial process may involve a mixture of primary and secondary interpretation (we will see from the example of *Derry v Peek* [6], in section 2.4 below, that judges carry out primary interpretation). It is also a mixture of reason and authority. Reason is necessary if the process is to generate a theory which bears some useful general relation to the domain it describes, but at some point reason does not provide a definite solution and a choice must be made by some agent empowered to make such choices.

Both primary and secondary interpretation may be used in the judicial process. In the English law, the judicial process is used to decide disputes arising from what, under the system analysis, would be different systems of law.

We will now make some comments on arguments, the domain and the relations between agents under the system analysis.

Arguments and argument moves. We will treat an argument in the conventional formal sense, at its most general, as a set of one or more premises that, under some interpretation, entail a conclusion. Specific arguments may have specific schemata, which give particular premises characteristic roles in the argument, and which gives the conclusion a characteristic status.

The point of referring to arguments here is to draw attention to the role of interpretation and to the way in which partial, analogue, interpretation is used to explain argument moves.

Argument moves are referred to in related work (see particularly the section on CATO [1] in Chapter 4). They are, generally speaking, not complete arguments under the definition set out above, but may be developed into complete arguments. The general idea arising from the system analysis is that argument moves are sentences put forward during a process (for example, a dialogue) but before the interpretation mechanism has produced a closed interpretation. Without a closed interpretation, the moves are free and cannot be complete arguments, but may, like factors, be legally relevant.

The domain. As we have said, the domain of the description is some of the relations between agents and between groups of agents. Those relations between the agents that are within the ambit of the system will be called, using common law terminology, the jurisdiction of the system. Those relations that are outside it will be called arbitrary (that is, they are not subject to the reasoning and authority of the system, although that is not to suggest that they are in themselves unreasoned or random). Examples of common law relations, such as contracts, the duty to act in good faith towards a class of agents (the fiduciary duty) and the duty to be honest (enforced by the tort of deceit). The common law relation that we use most often as an example in this thesis is the relation created by the voluntary assumption of responsibility by one agent to another.

Examples of arbitrary relations are moral and family obligations that agents may accept and honour without being under any legal obligation to do so. We assume that because the system changes through time its jurisdiction will change with time as parts of the society of agents and their relations are either brought within or fall out of the jurisdiction of the system.

There is a constant interaction between the between the jurisdiction and the arbitrary (that is, non-legal) relations of the community of agents.

We will refer to the group of agents between whom there are legal relations as the community of agents. It is natural to speak of the agents having a position in that community. That position is defined by all the relationships that that agent has with the other agents. To the extent that those relations are within the jurisdiction of the system we will call an agent's position its legal position. To the extent that it is outside the jurisdiction, we will call it an arbitrary position.

Legal Position. The legal position of an agent in the system is the legal theory that it accepts as applicable and binding on it and its relations with others. Remembering common law is based on interpretation by reference to one or more precedents, we can see that agents with different interpretations will have different legal positions even if they use the same words to describe their positions. The legal position of an agent can change, just as, in the human domain, a person's beliefs and understanding of the law change.

This description assumes that the legal position of the agent begins with that agent's self-interest taken from outside its participation in the system. This self-interest is the motivation for the agent to engage in the system, to get public acceptance of the position that furthers its self-interest.

That motivation causes the agent to construct a legal sentence that helps it achieve its goal. As explained above, the legal language will classify its domain. In this way, the agent's motivation gives the law an interpretation in relation to the domain.

The final point to note about legal positions is the difference between the legal positions of agents engaged in two types of dialogue, the difference dialogue and the issue dialogue. These two types of dialogue are explained in chapter 3. The general idea, sufficient for the present purposes, is that there are two types of dialogue, one in which differences of interpretation are aired between disputants ('the difference dialogue'), the other, in which disputes grounded in inconsistent interpretations are aired ('the issue dialogue'). The idea being that if a difference of interpretation cannot be resolved then it becomes an issue and must be moved up to a higher level dialogue to be dealt with.

In the difference level (which, in a dispute in court is the equivalent of the dialogue between the two parties), the legal positions of the disputants is as described above. This is as we would expect – the parties have different legal positions which are motivated, initially at least, by the self-interest of those parties.

In the issue dialogue (which, in a dispute in court, is equivalent to an internal dialogue conducted by the judge to decide the issues between the parties), the party or parties conducting the dialogue (ie, the judge in our example) does not have a legal position motivated by self-interest, instead the judge adopts the objective position of the reasonable agent. Again, this is as we would expect – we would not expect the judge to be motivated by self-interest. In fact, we will see that one of the procedural rules of natural justice – that no one may be the judge in his own cause – recognises this requirement.

If we cannot settle our difference then we will reach 'an issue' and we will be in 'dispute' in respect of that issue. Two agents that are in dispute not only have different legal positions, they are following different and incompatible theories. A dispute may be submitted to the decision procedure.

The community of agents. When considering the common law as a purely mechanical system, it is helpful to assume that it regulates the community of agents. The community of agents is a collection of agents, either human or virtual.

We will use the idea of the community of agents as the context in which to describe the relationships between the agents and the domain which is classified by the system and the relationships between agents and groups of agents. It is the overall container of the system. Those agents that refuse to recognise legal relations in the community of agents are “outlaws”. This word is taken from Baker [4] who, when describing the English legal system as it was prior to the development of the common law, states “*parties who do not co-operate may be outside the protection of the community by outlawry*”.

Now that we have the idea of agents that may or may not agree (ie, share the same theory) and may or may not be in dispute (ie, follow different theories) we can introduce the idea of communication between those agents being either internal or external in respect of the theories that they follow. So, an *internal* dialogue is a dialogue that takes place between agents that have the same legal position. An *external* dialogue takes place either within a single agent or between agents that are bound by different legal positions.

In chapter 3, we will assert that the behaviour of an agent or of groups of agents is regulated by ‘the regulatory layer’. The regulatory layer carries out the judicial process, by which differences and issues are decided

2.3 Levi’s Moving Classification System and the Syntax used in the Substantive Theory

2.3.1. Introduction

This section describes the syntax of the arbitrary language that is used by the legal system and the transformation rule of our common law system.

The next section will set out an extended extract from Levi’s essay and then make some further observations on Levi’s description of the common law. In the section after that we will develop the syntax used in and in constructing the substantive common law theory. Section 2.3.4 will describe the transformation rule of common law.

2.3.2 Levi's Description of Common Law Reasoning and Some Comments on it

Levi describes legal reasoning as follows.

"The basic pattern of legal reasoning is reasoning by example [which, he makes clear, is distinct from induction]. It is reasoning from case to case. It is a three step process described by the doctrine of precedent in which a proposition descriptive of the first case is made into a rule of law and then applied to a next similar situation. The steps are these: similarity is seen between cases; next the rule of law inherent in the first case is announced; then the rule of law is made applicable to the second case....The finding of similarity or difference is the key step in the legal process. // The determination of similarity or difference is the function of each judge. Where case law is considered,...,he is not bound by the statement of the rule of law made by the prior judge even in the controlling case. It is not what the prior judge intended that is of any importance; rather it is what the present judge, attempting to see the law as a fairly consistent whole, thinks should be the determining classification. ...// Thus it cannot be said that the legal process is the application of known rules to diverse facts. Yet it is a system of rules; the rules are discovered in the process of determining similarity or difference. A working legal system must therefore be willing to pick out key similarities and to reason from them to the justice of applying a common classification. The existence of some facts in common brings into play the general rule. If this is really reasoning, thought of in terms of closed systems, it is imperfect unless some rule has announced that this common and ascertainable similarity is to be decisive. But no such fixed prior rule exists. ...//...the kind of reasoning in the legal process is one in which the classification changes as the classification is made. The rules change as the rules are applied. More important, the rules arise out of a process which, while comparing fact situations, creates the rules and then applies them."

We will make four observations on Levi's description which are intended to help explain the conception of common law being described in this thesis.

First, we will adopt Levi's definition of the rule of precedent. (see section 2.3.4 below)

Second, in the decision procedure of this description, the *finding* and the *determination* of the key similarity or difference is carried out by the primary and secondary interpretation.

Third, the statement that "*the judge is not bound by the controlling rule of law*" is initially counter-intuitive to a lawyer who is used to working with 'rules of law' including the rule of *stare decisis* which says, broadly speaking, that, in the hierarchy of courts, a lower court is bound by the prior decision of a higher court. (There is a clear judicial statement of *stare decisis* in [19]). The answer, from our perspective, is that every case is different and the applicable "*rule*" must be constructed to suit each individual case. (Note also that we differ from Levi in that we do not accept that common law is a system of rules as distinct from indicative sentences).

Fourth, the non-existence of a "*fixed prior rule*" as to similarities and differences between cases is at the heart of our description of common law. There is no fixed, overall rule. Instead, common law continually constructs laws from precedents to apply to new cases.

2.3.3 A Syntax Based on Levi's Description.

The syntax used in constructing and expressing the substantive legal theory is limited to four types of structures, a case, a semantic extension (which is just a name for a collection of lists of different types of precedent), a function and a predicate.

A case. A case is the data structure that is input to and output from the transformation rule and decision procedure. Intuitively, a case is a data structure containing the facts and the issues and/or differences to be adjudicated upon and, subsequently, following adjudication, a record of the decision made.

The general data structure for case is: *case(objects, decision)*. In that data structure, 'objects' is a list of one or more sentences and 'decision' is the result following the

output of the case from the system: 'decision' may be empty (when the case has not yet been interpreted).

There are two types of cases, a 'new case' and a 'precedent'. A new case has not yet been subject to the transformation rule and so is uninterpreted, and its 'decision' will be empty. A 'precedent' has been subject to the transformation rule, and so it has been interpreted by the operation of the system and will have a 'decision'.

A Semantic extension. A semantic extension is a data structure that we have devised in this thesis to contain the precedents which form the structure for the interpretation relation. In terms of classification, it is the extensional definition of a concept described by a function of the legal language. The semantic extension developed in section 2.4 below, consist of four lists of precedents:

- those that contain the key characteristic of the class ("positive precedents");
- those that do not contain the key characteristics and have been previously classified as not being a member of that class ("negative precedents");
- those that do not contribute to the classification ("distinguished precedents"); and
- those that have previously been used to classify the legal concept in question, but, are decided to be no longer correct ("overruled precedents").

The idea for the structure of the semantic extension is taken from two sources. First, the pair used by Kripke [13] to achieve semantic closure as described in section 2.4, below. Secondly, from the lists of precedents that are seen in the decisions in the example domain. One of the best examples is in *Derry v Peek* [6] which is also summarised, in section 2.4, below. Such lists are present to a greater or lesser extent in nearly all decisions. The lists are normally presented as a chronological list (either in reverse or forward order) of precedents and in respect of each one an interpretation is made placing it in one of the lists in the semantic extension. We will explain how such a list is constructed below.

The semantic extension is only used in the construction of an interpretation of a function. Unlike the other structures, it does not have an obvious existence independent of the other structures of the system, but is a support structure which facilitates the interpretation of a function (see below). Again unlike the other structures, is not immediately recognisable in some structure in the natural language of the common law. Under our analysis, it might be described as the ratio of a pure common law decision.

Function. The intensional data structure for a class is a function with an argument and a value. The argument is a set of one or more key attributes of each and of all precedents in the first set of the extensional pair and the value is a name of that class.

We will sometimes refer to a legally interpreted function as a legal concept. The argument is the definition of the concept and the value is the name of the concept.

Here are two examples of legal concepts from the example domain.

“I think the authorities establish the following propositions ... fraud is proved if a false representation has been made (1) knowingly, or (2) without belief in its truth, or (3) recklessly, careless whether it be true or false ...”

From Lord Hershall’s opinion in *Derry v Peck* [6, page 374, also see section 2.4, below], fraud is the name of the legal concept there defined.

“... it should now be regarded as settled that if someone possessed of a special skill undertakes, quite irrespective of contract, to apply that skill for the assistance of another person who relies on such skill, a duty of care will arise.”

From Lord Morris’ opinion in *Hedley Byrne* [13, page 594, see Appendix 1], duty of care is the legal concept defined.

As with functions in conventional predicate logic, functions in law may be nested so that, for example, the concept of voluntary assumption of responsibility (defined above) may be a sub-type of the concept of negligence.

Predicates and the law predicate. As in conventional predicate logic, a predicate in a legal theory is a property of one or more concepts or a relation of two or more concepts. It is the property or relationship between the concepts that is the syntactic element of this structure.

There are very few predicates in our example domain. The following example of the use of a predicate is taken from Lord Goff's opinion in *Henderson v Merrett* [14, page 533].

"... it follows that an assumption of responsibility coupled with concomitant reliance may give rise to a tortious duty of care irrespective of whether there is a contractual relationship between the parties, ..."

This statement could be represented using the predicate 'co-extensive', as in 'co-extensive (tortious duty, contractual duty)', where tortious duty and contractual duty are legal concepts.

This description will also use one special predicate, "the law predicate" which may be applied to any legal sentence which has achieved semantic closure (as described below). A very clear instance of the law predicate would be any statement beginning "It is law that ...". From the three quotations set out above,

- *"the authorities establish the following propositions ..."*;
- *"it should now be regarded as settled that ..."*; and
- *it follows that ..."*.

all are examples of the law predicate. We will note in passing that the United Kingdom Parliament has its own form of words for the law predicate for legislation which is stated at the beginning of each Act of Parliament and which states:

"Be it enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:-"

An examination of the example domain suggests that the common law is a low order language, possibly second order in which all the relations between concepts are expressed in first order predicates and the only second order predicate is the law predicate.

2.3.4 The Transformation Rule

The transformation rule of the common law system states that if the objects of a new case are like the objects of a precedent, then construct and apply, to the objects of the new case, the law that applies to the precedent. This rule is based on the common law rule of precedent. We have used Levi's definition of the rule of precedent, quoted above.

This transformation rule could be presented in the scheme of the argument, as follows:

PREMISE 1: New case (attribute1(b)),

PREMISE 2: Precedent case (attribute1(a), duty(a)),

PREMISE 3: If attribute1(X) then duty (X).

CONCLUSION: duty (b).

There are three points to note about the transformation rule. First, its application takes facts that are common to both the new case and the precedent cases and inserts them into the antecedent of a function structure. Intuitively, it is easy to see that there are many common facts, for example, 'all the precedents were decided on a Monday and it is Monday today', etc. The common facts that are chosen to from the ground of the interpretation are the factors (legally relevant facts). The relevance of facts is determined by the pre-existing substantive theory and its structure.

Secondly, we need to deal with the common situation in which legal precedents are reconsidered and functions (that have previously been interpreted into concepts) are reconstructed (and reinterpreted). The procedural description of reconstruction

(assuming, for the sake of simplicity, that there is no dispute about any step in the procedure) is as follows.

Assume the existence of a chronological list of precedents that have been numbered sequentially from 1, for the earliest in time, to N, the most recent.

Step 1:

- (i) Find precedent for new case ('PrecedentN');
- (ii) reconstruct function;
- (iii) record the Precedent and the reconstructed function ('the Record');
- (iv) go to Step 2.

Step 2:

- (i) Find PrecedentN-1.
- (ii) IF: there is no such precedent, THEN: print out the Record and apply the law. ELSE: go to Step 1 (ii) (that is, reconstruct the function to take account of PrecedentN-1)

Thirdly, we need to explain how predicates are constructed. Our general idea is that once two legal concepts (for example contract and negligence) have been constructed and both apply to a new case, but, give different outcomes, then those two concepts are ordered by secondary interpretation (that is by the judicial process) by a predicate. (See, for example, the comments on *Henderson v Merrett* in the section above).

2.3.5 A Note on Rules

It would have been possible to treat the sentences of law as rules rather than as functions and predicates. However, this is a far less satisfactory analysis, for at least four reasons. First, rules are not structures that are constructed by the application of the transformation rule. Rules are, usually, stated axiomatically as part of a rule based system. Second, in formal systems there are significant differences between a material implication (which has at least some resemblance to the if/then structure of a rule) and a rule from a rule based system.

Material implication is a truth function which returns a truth value depending upon the truth value of its component sentences and may be constructed from any pair of sentences. The value of a rule in a rule based system will generally depend upon other rules in the rule base and the procedure by which those rules are applied. In particular, rules in rule based system are typically unused if the antecedent is false, and no interpretation is required for these cases.

Third, it follows from the system analysis and makes for an elegant description, to say that functions are the basic building blocks of the common law and that they are constructed by a process of primary interpretation by reference to precedents. Under the system analysis, legal rules are given an interpretation, by authority.

Fourth, we will say that legal rules have a prospective application whereas concepts and predicates do not. The concepts can only have a prospective application through the operation of the transformation rule which always carries with it the risk of reinterpretation.

2.4 Semantics of a Substantive Common Law Theory

2.4.1 Introduction

Initial Introduction. This section describes what we mean by semantic closure of a theory and how that semantic closure is achieved. There are three parts to our general idea. First, we will say that a theory must be semantically closed in order to form the ground for an acceptable argument. (An acceptable argument is, broadly speaking, one which is defended from attack by other arguments – it is explained in more detail in section 3.5.2. A theory is a ground for an argument if, under that theory the conclusion of the argument is entailed by its premises).

Secondly, we will say that semantic closure results from the successful establishment of an interpretation relation between the theory and one or more precedents. Thirdly, we will say that a successful interpretation is achieved by construction of a closed semantic extension. Remembering, from section 2.3.3, that a semantic extension is a

list of precedents some of which are followed, others of which are distinguished etc, a closed semantic extension is one in which all the precedents that are under consideration have been placed in one of the categories of the extensional

In the rest of this introduction we will comment on semantics generally.

Semantics generally. Semantics is concerned with the meaning or significance of the statements of a language. There are various different types of meaning/significance and various different ways in which that meaning/significance can be specified. We will develop the idea of legal semantics by reference to the example of classical logic.

In classical logic, the semantics of a sentence of the language is based on its truth conditions (the conditions under which it is or is not true) and is usually defined by a relation, known as 'an interpretation', between the sentence of the language and some domain such that the sentence is true if and only if it is a true representation of the domain. The interpretation and the domain taken together are referred to as a model for the language and this approach is usually referred to as model theory semantics.

The semantics of this description is similar to classical model theory semantics in that it uses the idea of interpretation, but it differs in two ways. First, in classical model theory the interpretation is given to the system by its maker. In this description, the interpretation is a product of the operation of the system and, at least to begin with, is contributed to by the arbitrary position of the agents of the system. Secondly, as noted above, the interpretation in this description is what we have described as analogue to suggest that it may exist as a matter of degree.

The rest of this section is arranged as follows. The next section, 2.4.2, describes a semantically closed theory. Section 2.4.3 explains primary interpretation (that is, the construction of a concept for the first time). Section 2.4.4 contains an extended example of reinterpretation and section 2.4.5 explains our proposed mechanism for constructing a closed semantic extension.

2.4.2 A Semantically Closed Theory.

As mentioned above a semantically closed theory is one, the extensional definition of which is a closed semantic extension and one on which an acceptable argument can be grounded. The intuitive idea that underlies these assertions will be explained using the concept of fraud (which is the subject of our extended example in section 2.4.4 below) as an example theory.

Assume that the fraud theory states: 'A statement is fraudulent if it is known to be untrue by its maker or if its maker is reckless as to whether or not it is true'. Under our analysis, that theory is interpreted by the semantic extension of precedents set out in *Derry v Peek* [6 – the case from which the extended example, below, is taken].

An example of an argument grounded on the fraud theory is: 'if a person makes a statement he/she knows to be untrue then that person is fraudulent'.

That argument will be acceptable in the sense of the word as it used in argumentation frameworks, described in section 3.5.2 below, if any argument that attacks it is itself attacked. Any argument that attacks our example argument will be attacked, at least, by the argument that it is not authorised by the precedents in the semantic extension. This leads us to be able to describe a semantically closed theory, in relation to the precedents in the semantic extension as being consistent and complete in the following senses.

The relationship of consistency is established through the precedents of the system. A theory is consistent if there is no precedent in its domain of application that is both in and not in the class defined by that law. Obviously, an interpretation should be consistent, because if it is inconsistent, it will not give the agent a clear instruction as to how to conduct itself.

Note that consistency (and completeness below) are defined by reference to the precedents of the system, the cases that have actually arisen in practice, rather than to the actual cases of the domain of application (that is, including all those cases that have not yet been the subject of interpretation). This allows for the possibility of

change as new cases come to be considered and also is explained by the fact that since the domain is assumed to be infinite, it would not be possible to take account of all the possible cases in a finite process.

A theory is complete if all the relevant precedents in the domain of application are classified by it, that is all the precedents in the domain of application are either inside or outside the class defined by the law. An interpretation should be complete, because, if it is not, the agent cannot be sure that the precedents that it has not included in the interpretation would not change the outcome of the process.

In summary, the process of interpretation will come to an end when it produces a closed structure which will be complete and consistent.

The establishment of the modern concept of voluntary assumption of responsibility in Hedley Byrne [13] is an example of interpretation. A key part of one of the opinions from this decision is analysed in Appendix 1. The concept is established by an interpretation of a single precedent (Cann v Willson [2], it is also interesting to note in passing that, prior to the decision in Hedley Byrne, Cann v Willson had been overruled).

2.4.3 Primary Interpretation of a Sentence.

This section considers the simple case in which the agent constructs a legal concept by application of the transformation rule, that concept is not challenged and, therefore, is not referred to the decision procedure. We assume, in this section, that the precedent chosen by the agent has not previously been the subject of the transformation rule (in its capacity as a precedent, rather than as a new case) and, therefore, this is the first time that it has been used in an interpretation. We will also assume that, for the sake of simplicity, if the agent already has a legal position (that is, that it already conducts itself in accordance with a legal theory), then no part of that pre-existing theory applies to the new case that the agent faces. Thus, for the purposes of this section, we assume that the agent has an arbitrary position in the new case, although we will allow our agent to apply the new law that it constructs together with other norms that it accepts, that is, we will allow the new law to be

incorporated into the agent's overall legal position. This is simply so that, when the agent has constructed its law, it has the necessary supporting structure in place to be able to act on it.

We will explain primary interpretation from the practical perspective of the agent applying the transformation rule.

Interpretation by absence of dispute. The ought value of a theory (ie, what it is that the agent ought to do when faced with the facts of a particular new case) in the simple case is given by putting that case in the same class as a precedent. Another way of saying the same thing is to say that the new case and the precedent both contain instances of the same concept and therefore justify being dealt with in the same way. That classification tells the agent that in a particular case a particular conduct ought to be adopted.

The interpretation of a theory is established as a consequence of the way in which the theory is constructed. The agent chooses the precedent to apply. The precedent forms a link in the chain connecting the theory that is to be constructed with the domain that it relates to in that the precedent is an instance taken from that domain. The agent must choose a precedent that is similar to the new case, but this itself is a matter of interpretation – the agent has a choice as to how, conceptually, it treats its position and exercises that choice through the precedent that it chooses to follow. It is likely, if it can, to choose the precedent that discloses the outcome that will enable it to achieve its arbitrary goals.

Since, as we have assumed for the sake of simplicity, the theory is successfully constructed and applied (because at least some similarity is found between a precedent and the new case) without dispute or difference, no secondary interpretation will be necessary.

When constructing a theory from precedent, the agent will be motivated to choose the attributes of the precedent, which are to form the definition of the theory, such that the concept will support its arbitrary position.

An example

This example is taken from Lord Herschell's opinion in the House of Lords decision in *Derry v Peek* [6]. There are examples in many of other decisions in the example domain. It is an example of how the semantic extension is used to reconstruct a rule.

Derry v Peek is a decision which primarily concerns the definition of fraud as a constituent of the tort of deceit. It arises in the example domain by being cited in the decision in *Hedley Byrne*.

After some preliminary observations, Lord Herschell reviews the decision of the Court of Appeal which is the subject of the appeal and finds that all the Court of Appeal judges "*adopted as the test of liability, not the existence of belief in the truth of the assertions made, but whether the belief in them was founded upon any reasonable grounds....This renders close and critical examination of the earlier authorities necessary.*" [p363] and so begins his reinterpretation exercise, in which he puts every precedent in one of the lists of a semantic extension.

[p363] "*I need go no further back than the leading case of *Pasley v Freeman* [a decision made in 1789]...in this case it was evidently decided that fraud was the basis of the action, and that such fraud might consist in making a statement known to be false...*" – put in the list of positive precedents.

[p364] "*Haycraft v Creasy ...it is a distinct decision that knowledge of the falsity of the affirmation made is essential to the maintenance of the action..*" – put in the list of positive precedents.

[p365] "*I now pass on to *Foster v Charles*...This is the first of the cases in which I have met with the expression "fraud in law"...But I do not think that the Chief Justice intended to indicate any doubt that the act which he characterised as a fraud in law was in truth fraudulent as a matter of fact also"* - put in the list of positive precedents.

[p365] "*Foster v Charles was followed in *Corbett v Brown* and shortly afterwards in *Polhill v Walter*. The learned counsel for the respondent placed great reliance on*

this case, because although the jury had negatived the existence of fraud in fact the defendant was nevertheless liable. It is plain, however, that all that was meant by this finding of the jury was, that the defendant was not actuated by any corrupt or improper motive” – in the list of distinguished precedents.

[366] *“The next case in the series, Taylor v Ashton, is one which strikes me as being of great importance...Now it is impossible to conceive a more emphatic declaration than this, that to support an action of deceit fraud must be proved, and that nothing less than fraud will do..” – in the list of positive precedents.*

[p367] *“All the cases I have hitherto referred to were in courts of first instance. But in Collins v Evans they were reviewed by the Exchequer Chamber. ...Is it not clear that the Court considered that fraud was absent if the statement was “made honestly, and in the full belief that it was true”?” in the list of positive precedents.*

[p368] *“in Evans v Edmonds Maule J. expressed an important opinion, often quoted, which has been thought to carry the law further than the previous authorities, though I do not think it really does so.” – in the list of distinguished precedents.*

[p368] *“I now arrive at the earliest case in which I find the suggestion that an untrue statement made without reasonable ground for believing it will support an action for deceit. In Western Bank of Scotland v Addie...//...I say, with all respect, that the previous authorities afford no warrant for the view that [was expressed by Lord Chelmsford] – in list of overruled precedents.*

[p370] *“The opinions expressed by Lord Cairns in two well-known cases have been cited as though they supported the view that an action on deceit might be maintained without any fraud on the part of the person sued. I do not think that they bear any such construction. In the case of Reese Silver Mining v Smith ...//When Lord Cairns speaks of it as not being fraud in the more invidious sense, he refers, I think, only to the fact that there was no intention to cheat or injure.//In Peak v Gurney...was but an affirmation of the law laid down in Forster v Charles, Polhil v Walter and other cases I have already referred to”. – in the list of distinguished precedents.*

[p372] *"I come now to very recent cases. In Weir v Bell Lord Bramwell vigorously criticised the expression "legal fraud" – in the list of positive precedents.*

[p372] *"it only remains to notice the case of Smith v Chadwick. ...//It must be remembered that it was not requisite for Sir George Jessel...to form an opinion whether a statement carelessly made, but honestly believed, could be the foundation of an action of deceit. The decision did not turn on any such point" – in the list of distinguished precedents.*

[p374] *"Having now drawn attention, I believe to all the cases having a material bearing upon the question under consideration, I proceed to state briefly the conclusion to which I have been led. I think the authorities establish the following propositions..." – he then sets out the concept of fraud in deceit quoted above.*

2.4.5 The Mechanism for Constructing a Closed Semantic Extension

This section will summarise Kripke's idea of semantic closure which formed the original inspiration for the mechanism of interpretation and will then explain the mechanism used in this description.

Kripke's 'Outline of a Theory of Truth' [13]. Kripke's paper addresses the liar paradox in propositional systems, that is, the truth value of a sentence such as 'this sentence is false'. Very broadly speaking, Kripke's idea is to avoid the problem posed by the paradox by a method of interpretation that does not give paradoxical sentences a truth value in the first place.

Kripke assumes that we have an object level propositional language and a meta-language with an uninterpreted truth predicate (since it is uninterpreted, we cannot use it as we do not know what arguments it takes) and a pair, '<S1, S2>', in which S1 and S2 are sets.

There are three steps to Kripke's method. The first step is to add to S1 and S2 all the sentences of the object language that are known to be true (these are put into S1) and known to be false (these are put into S2). The result of this initial step is to give a

partial interpretation to the semantic predicate (which is in its meta-level) in that there are some sentences which it can take as an argument – precisely those in S1.

However, there will also be many compound sentences (ie, sentences formed from two or more object sentences and one or more of the operators of the language) which are not in either S1 or S2 and therefore have no semantic value. The second step in Kripke's method is to evaluate these compound statements by reference to the truth value of their component sentences (there are various ways of doing this in propositional languages, that need not concern us here).

The inclusion of some of the compound sentences in S1 and S2 obviously changes the interpretation of the truth predicate of the language, because, it can now take, as an argument, various compound sentences that were, prior to step two, uninterpreted.

The third step of the method is to jump to the next meta-level and repeat steps one and two above – that is, add to S1 and S2 (which already contain all the object level true and false sentences), all the true and false meta-sentences and their compounds to S1 and S2 respectively.

The three steps are repeated until a level is reached at which no further sentences can be added to S1 and S2, which is referred to as a fixed point. The method comes to an end at that fixed point and the language can be said to be semantically closed in that the semantic predicate can be used to refer to the sentences of the languages – as those to which they can be applied to have been extensionally defined by S1 and S2. There will be some sentences of the language that are not members of S1 or S2, such as the liar paradox sentence and, therefore, they cannot be said to be either true or false – exactly Kripke's aim.

Our method. Our method differs very significantly from Kripke's, not least because his structure (that is $\langle S1, S2 \rangle$) contained propositions from a propositional language whereas ours will contain precedents. However, we will take three important ideas from Kripke. First, that there is a semantic predicate that can apply to all the other sentences of a sequence of meta-languages. As stated above, the law predicate we will use is 'it is law that...'

Secondly, the idea of an extensional structure which can be used to give meaning to a concept and, thirdly, an iterative step-wise process which closes at a fixed point. These three ideas enable us to describe how the meaning of a legal theory can be constructed from precedents.

Against, this background, our method assumes the existence of:

- a semantic predicate, 'it is law that...';
- an extensional structure which we have called the semantic extension. The semantic extension could consist of a variety of different lists, depending on how precedents are treated in the system being described. We will assume a semantic extension consisted for a four-tuple: "<positive precedents, negative precedents, distinguished precedents, overruled precedents>"; and
- a step wise process that ends with closure.

The step-wise process that we will use is as follows:

Step 1. An agent ('the claimant') instantiates the law predicate with a legal sentence, for example: 'it is law that bankers owe a duty to the recipients of their financial references', by application of the transformation rule in a new case. The precedent from which the legal sentence is taken is put in the list of positive precedents for that sentence. The first step is what we have been describing as primary interpretation. Step 1 may be repeated many times by an agent before Step 2, below, takes place, that is it may be sometime before that agent's primary interpretation is challenged;

Step 2. A second agent ('the defendant') challenges the claimant's primary interpretation and the claim is referred to the decision procedure. Both the claimant and the defendant have a semantic extension, each will contain different precedents or the same precedents in different sets, the obvious example being that what will be a positive precedent for one of them will be a distinguished or overruled precedent for the other. During the dialogues which take place in the decision procedure each disputant will put forward precedents which must then be accommodated in the

semantic structures of each of the disputants. The legal theory grounded on the extension may be modified during this process.

The second step comes to an end in one of two ways. First, one of the disputants cannot construct a semantic extension which contains all the precedents that have been put forward and support that disputant's legal theory (in chapter 3 will call this type of ending resolution or rationalisation). Secondly, both disputants can construct semantic extensions which support inconsistent theories and there is an issue between the disputants that can only be decided by the application of a decision mechanism, which simply chooses one of the semantic extensions in preference to the other.

The result of the second step is that the new case is decided and becomes available to the agents as a precedent;

Step 3. In the third step, steps 1 and 2 are repeated by an agent choosing the precedent created in those steps as the subject of the transformation rule.

This chapter has described the agent based context for our description of common law in which agents have a language, engage in processes and exercise reason and authority. It has then analysed common law as a system within that context using ideas that are familiar to those who study formal languages. The key parts of common law that emerge from that analysis are a theory, a transformation rule, and a decision procedure.

Finally, we have described how a common law theory was given a semantics by a two stage interpretation process. The first stage, primary interpretation being the operation of the transformation rule, the second stage, secondary interpretation, being the operation of the decision procedure. In this part of this chapter we have focused on primary interpretation. The next chapter will focus on secondary interpretation, that is the decision procedure.

3. Decision Procedure – The Rational Trial

3.1 Introduction

Initial Introduction. This chapter describes the judicial process. Under the system analysis, the judicial process is the decision procedure of the system which provides the secondary interpretation. It is constructed from a combination of the basic elements of the system. In this introduction and in this chapter generally, we will focus on the description of the judicial process as a decision procedure, however, its description as secondary interpretation is set out in section 3.2.

There may be different ways in which the different basic elements of the system analysis can be configured to form a decision procedure. The elements that we will use in this description are the process of dialogue (which in the decision procedure we will call the ‘regulated dialogue’) and reason and authority.

The decision procedure we describe consists of a regulated dialogue and a decision mechanism. The basic operation of this decision procedure is as follows.

- input a difference;
- find an issue by regulated dialogue. If the difference can be resolved so that there is no issue, then end;
- if an issue is found, then refer that issue to a regulated dialogue at a higher level of generality to be rationalized into a consistent theory of law; and
- if a further issue is found at the higher level of generality, then, if possible refer upwards again, but if no higher level of generality is found, then apply the decision mechanism in order to impose a decision.

Again, there may be many different ways in which this type of decision procedure may be configured. The particular configuration that we will describe will be called the ‘rational trial’. The general idea of the rational trial is that it should give priority to

reason and rationalization over authority. The rational trial gives priority to reason and rationalization in two ways. First, the decision procedure as a whole is reason based. What we mean by this is that it proceeds from a position of and in a context of reasonableness where reasonableness is defined as the position adopted by the hypothetical reasonable agent. The idea for the reasonable agent comes from the references to "the reasonable man" in English common law decisions (we will quote some examples below).

Secondly, where possible, the rational trial will use a reason based decision mechanism in preference to an authority based decision mechanism.

In the rest of this introduction we will make some introductory comments on the judicial process and some of the limits on our description of it and then make some introductory comments on the regulated dialogue, the decision mechanism and on the rational trial.

The judicial process. The main point to note about the judicial process of the modern common law is that it is used to decide disputes from what, under the system analysis, are different systems of law. It is used to decide disputes arising out of legislation and out of equity, often in the same case. Its procedures have also been codified into statute. Our description of it is an idealization which overlooks these practicalities.

The decision mechanism. A decision may be made by either reason or authority. Broadly speaking, a decision by reason is a decision which is the conclusion of the application of an argument. A decision by authority is one which is simply imposed. We will make three introductory comments about reason and authority.

First, whilst we have asserted, in Section 2.2.2, that reason and authority are the two fundamental attributes of the processes carried out by the agents, what we see when we look at the English common law is that reason and authority appear to repeatedly qualify each other. For example, precedents, which are the grounding of precedent based reasoning, are often referred to as "the authorities", a judge when exercising judicial

discretion (a form of authority) must act reasonably (this is explained in more detail below). Reason and authority appear to alternate in that a decision by reasoning becomes an authoritatively binding precedent and a decision by authority can become ground for the application of the rule of precedent. They also appear to stand as exceptions to each other, where a law is declared by authority then reason is used to find an exception to it. Where the law is the conclusion of reason, then we see the appeal to authority being used to make exceptions to the general rule. We see this second instance particularly in the historical appeal to equity to alleviate the rigour of the application of the common law.

Our second comment follows from our first. We have defined common law as a legal system that gives priority to reason over authority in both primary and secondary interpretation. Therefore, in the secondary interpretation, carried out in the judicial process and following the behaviour of reason and authority described above, we expect to see authority being used to make exceptions to the application of common law. As mentioned above, we see this in appeals to equity to "*correction of law where it is defective owing to its universality*". (This quote is taken from Aristotle by Baker [4] from whom there is a more extensive quote in Section 5.4).

Thirdly, in the judicial process, reason and authority are proceduralised, by which we mean that they are expressed in the procedural rules of the system. For example, Oliver J. describes two different decision mechanisms in *Midland Bank –v- Hett Stubbs & Kemp* [19, quoted in section 1.5], when he states that he must ... "*elect which [precedent] to follow and if I am not free to elect, I must follow the later decision*".

To "*electing which precedent to follow*" is an arbitrary decision mechanism and may be either by reason or by authority, depending on whether the judge has a reason for it. To "*follow the later decision*" could be an example of a legal decision mechanism (assuming that there is a rule of procedure directing the decision maker to follow the later decision).

The regulated dialogue. Under the system analysis, a dialogue is a type of process that takes place between agents. There are other processes such as what we have called a dialectic. We will say that, in the decision procedure, a dialectic is used to generate an elaboration of an interpretation as, for example was generated by Lord Hershall in *Derry -v- Peek* [6, as described in section 2.4], We are not, however, concerned with these other processes beyond that and will concentrate on dialogue.

There are two introductory points to make about the use of dialogue in the decision procedure. First, the dialogue is regulated by the judge, hence our name for it, the regulated dialogue. The benefit, to this description of the regulated dialogue is that it gives the process a second, higher level, the regulator level, to which issues can be referred when they occur at the lower, the disputant level. The underlying proposition put forward in this description is that the dialogue process carried out at the lower level can then be repeated at the higher level, under slightly different procedural constraints.

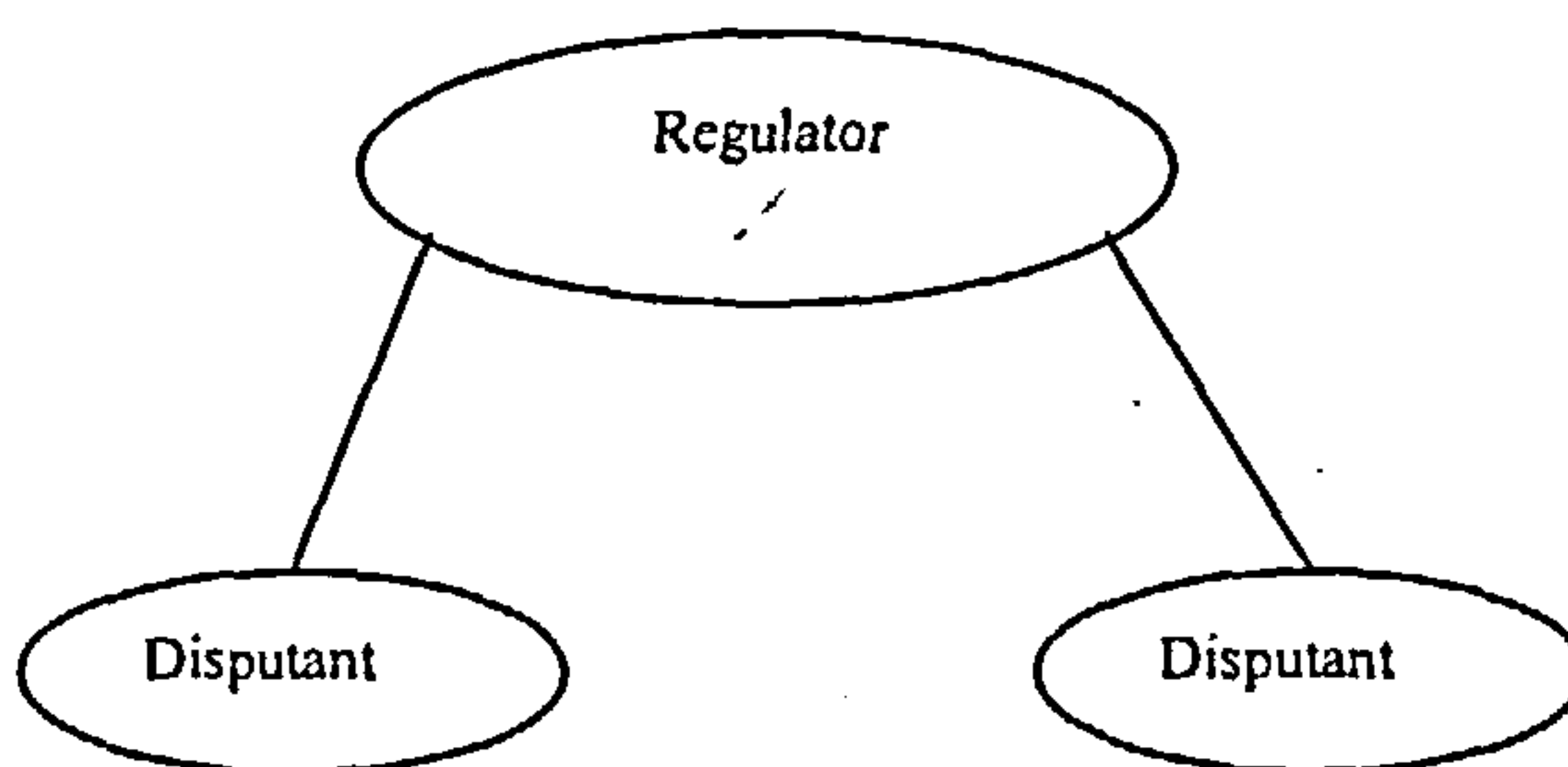
The second point about the regulated dialogue is that it is separated into two parts, the difference dialogue and the issue dialogue. The difference dialogue takes place between the disputants and as the name suggests, takes as its input a difference between the parties' legal positions. It gives as its output either a resolution of that difference or an issue. An issue dialogue takes place at the regulator level, takes as its input an issue and gives as output, either a rationalization of that issue, which can be passed back to the lower level, or a further issue, which must be referred up to a higher level, or decided through arbitrary choice.

The use of two different types of dialogue is an idealization for dealing with analogue interpretation. The general idea is that an actual dialogue in the common law is a mixture of difference and issue, depending on the position on the interpretation spectrum the dispute is taking place.

The Rational Trial. The basic decision procedure is developed into the rational trial by following two ideas. First, it is inspired by an idealization of parts of the modern

English judicial process. Second, it should be made of simple building blocks out of which more complex structures and processes can be modeled.

The Rational Trial is inspired by the modern English judicial process in at least three ways. First, it has a triangular structure as its basic processor which is an idealization of two disputants before a single judge. A diagram of the triangular structure is as follows:



Secondly, in the rational trial, the regulated dialogue can be repeated, as long as an issue remains, three times to reflect the appeal structure through the three levels of the Supreme Court (that is, the High Court, the Court of Appeal and the House of Lords).

Thirdly, in the rational trial, the issue dialogue (which in the basic regulated dialogue would be conducted internally by the agent at the regulator level) may be “opened up” so that the disputants participate in it. This follows the common law judicial process (as presently constituted), in which the judge or judges (ie, the agent or agents at the regulator level) hear submissions of the disputants on the issue.

The idea that the rational trial should be foundational is also expressed in the requirement that each difference and issue is assumed to be separated out and subject to an individual dialogue. In the actual judicial process, many issues and differences may be heard together and there may be meta issues and meta differences, for example, in respect of which of a list of issues should be dealt with first. Whilst separating out issues and differences is necessarily an interpretive step when applied to the analogue

interpretation, it is of great practical benefit when managing issues by use of an argumentation framework as described in section 3.5 below.

The rest of this chapter is arranged as follows. Section 3.2 summarises the judicial process from the perspective of interpretation. Section 3.3 describes reason and authority and the two ways in which they are used in the decision procedure, Section 3.4 describes the regulated dialogue and Sections 3.5 and 3.6 describe the rational trial.

3.2 Secondary Interpretation

As stated at the outset of this chapter, this description of the judicial process is a description of a procedure rather than a description of the interpretation constructed by that procedure. (Broadly speaking, we might say that we are describing the proof theory of the system rather than its semantics). However, under the system analysis, the judicial process was also described as a process of secondary interpretation in which the interpretation established by the primary interpretation is tested and may be confirmed, changed or overruled. In addition, much of this thesis is written on the assumption that it is the interpretation of the law that is the key to understanding, explaining and formalizing it. Therefore, it is appropriate to say something about the judicial process as a form of secondary interpretation. We will make three points about secondary interpretation.

First, as with primary interpretation, in secondary interpretation the interpretation relation may be between the legal theory and something other than a precedent. For example, the relation may be to an underlying value or public policy. We see from time to time, in the example domain, that judges do rely on these sort of relations. However, since we have founded our definition of common law on an interpretation relation between the legal theory and precedents, we will limit the rational trial to a process of secondary interpretation that uses only precedents as the structure to which the legal theory is related by interpretation.

Secondly, we need to explain what happens to semantic closure during the judicial process. The idea here is that the initial semantic closure achieved by the claimant is reopened to the extent that it is not binding on the judge nor on the opposing party whilst the dispute is in court. Once a decision has been reached the theory is reclosed further along the spectrum of interpretation towards general acceptance.

Thirdly, we need to explain resolution and rationalization in terms of secondary interpretation. The idea here is that in resolution one of the disputants is unable to maintain its legal position and, therefore, the difference is resolved in favour of the opponent's interpretation. In rationalization, the two positions are included in a single more general statement of the law language.

3.3 Reason and Authority in the Decision Procedure

3.3.1 Introduction

We have defined common law as a reason based legal system and we have seen how primary interpretation by application of the rule of precedent can be described as a reason based process. This section will look at reason and authority in secondary interpretation, that is, in the decision procedure.

The balance between reason and authority plays an important part in this thesis. Our general idea is that reason results in the uniform application, without exception, of theory, whereas authority may make exception to this uniform application. Reason without authority would lead to a stable system which left some questions unanswered and authority without reason would lead either to a disintegration of the system into fragments or to a procrustean system where every question received the same answer. Therefore, the balance of reason and authority is needed to keep the system in the state between extremes.

Reason and authority are used in two ways in the decision procedure. First, reason provides the general context and basis for the process and, secondly, they are used in combination in the decision mechanism to decide hard cases that cannot be either resolved or rationalized under the applicable procedure.

The rest of this section is organized as follows. Section 3.3.2 describes the idea of the reason based decision procedure and section 3.3.3 describes the role of reason and authority in the decision mechanism of the rational trial.

3.3.2 The Reason Based Decision Procedure

This section will describe how the decision procedure of common law is a reason based process. The general idea is that the regulator takes a reasonable position in regulating and deciding the dispute. This is taken from the idea of 'the reasonable man' in the English common law.

Underwood Lewis [31], refers to two of the many attempts at a definition of this type of reason. First, that stated by Sir Fredrick Pollack in 1929 [20]:

"what is reasonable" refers to "an ideal standard, which...is none other than that general consent of right minded and rightly informed men which our ancestors called reason. ...In modern terms, we say that the duty of the court is to keep the rules of law in harmony with the enlightened common sense of the nation."

Secondly, *"the standard of "reasonableness" is taken to be simply what the average member of the community thinks is reasonable. An instance of this use is found in Baker v Herbert (1911) [[1911] 2 K.B. 633 at 644], where it was stated that the common law "is, or ought to be, the common sense of the community."*

We translate this into part of the rational trial by saying that the regulator must take the position taken by the hypothetical disinterested agent in respect of a dispute that is

subject the decision procedure. We equate the first definition of reason with the second by saying that the common position of the community of agents is the set of all laws that would be accepted by any agent when not motivated by its own self-interest.

3.3.3 Reason and Authority in the Decision Mechanism

Under our analysis, the purpose of the decision mechanism is to decide the dispute that cannot be decided by resolution or rationalization. The ordeals of the pre-common law are examples of authoritarian decision mechanisms. . Baker [4, page 11] describes these decision mechanisms as types of proof, as follows:

“The ordeal, which is found in many primitive systems of law, is an appeal to the deity for his miraculous intervention in the administration of human justice. The two forms of ordeal consecrated by the early Christian church were those of hot iron and water. In the former, a piece of hot iron was placed in the party’s hand for a short length of time, the hand sealed and inspected after a few days; if there was no blister, God had found the party innocent. The ordeal of water involved trussing a party and lowering him into a pond; if he sank, the water “received him” and so he was innocent, and he was pulled out before he was drowned ... In 1215, the Lateran Council forbade clergy to participate in ordeals, and they died out at about this time. Trial by oath [a different form of proof] was to survive for centuries”.

In common law, according to our definition, the decision mechanism should give priority to a reason based mechanism. We see this in the English law in the appeal procedure. The idea being that the reason based decision mechanism is to take the decision again under a slightly different procedure and see if it results in a rationalization or resolution that could not be achieved in the first decision. However, in order for decisions to be reached within the operation of the appeal process (that is, at first instance and in the Court of Appeal in the English common law) and when the appeal process comes to an end (that is, if the House of Lords cannot achieve a

resolution or rationalization in the English common law) there is a need for an authoritarian decision mechanism.

As we stated in the introduction to this chapter, Oliver J's decision in *Midland Bank v Hett Stubbs and Kemp* [19 and quoted in section 1.5] is an example of an authoritarian judicial mechanism from the English common law.

We will make three points in this section about the relationship between reason and authority.

First, decisions by reason or authority may be incorporated into common law by forming the ground, as a precedent, for a decision in a subsequent new case, but, reason is given priority over authority (in that the transformation rule is always applied) which is, perhaps another justification for the name 'rational trial'.

Secondly, in the common law judicial process, we are only concerned by decisions made by judges in court. However, we have idealized and generalized that procedure in developing the idea of the rational trial so that the same general process goes on at all levels of the system, from the lowest (the processes internal to a single agent) to the highest (the process between two groups of agents before the highest court). Therefore, we will assume that there is a mix of reason and/or authority at each level of the rational trial.

The third comment substantiates by example, our idea that the general approach of the common law is reason based and that exceptions are made to the outcome of that reason based approach by authority. Our general idea is that the rigor of the common law is mitigated by equity. First, a quotation from Coke's commentary upon Littleton written in 1628 and quoted in [33] to illustrate the rigor of English common law of his period:

"It is better saith the law to suffer a mischief that is peculiar to one, than an inconvenience that may prejudice many...that a private person should be damnified by

the rigor of the law, than a general rule of law should be broken to the general trouble and prejudice of many..”

Next, as an example of equity being used to make exceptions to the general application of the English common law, Baker [4, page 42] quotes Lord Ellesmere’s speech in the Earl of Oxford’s case (1615) as an illustration (the reference to “Chancery” is to a separate court where the Chancellor sat as a judge and dispensed equity):

“The cause why there is a Chancery is for that men’s actions are so diverse and infinite that it is impossible to make any general law which may aptly meet every particular and not fail in some circumstances”.

We are describing common law as a moving classification system. It is the decision procedure generally and the decision mechanism within that procedure that determines the extent to which the system ‘moves’ (that is how much, if at all, the substantive theory changes with each decision). When discussing change we will assume that a decision mechanism is either conservative or innovative. A conservative mechanism will preserve the pre-existing status quo, for example if a particular law had not previously been applied to a particular object, then under the conservative mechanism it would not be applied to that object in a new case. An innovative mechanism will apply law in new ways and create new law. Having given reason priority as a decision making mechanism, it is reason that is the conservative mechanism in our description and authority that is the innovative mechanism.

3.4 The Regulated Dialogue

3.4.1 Introduction

Under our analysis, dialogue and dialectic are basic processes. This section will describe the two basic processes, as they are used in the decision procedure, although we will concentrate on the dialogue. The basic dialogue is called the regulated dialogue, the

general idea being that dialogue between two processors (whether they be inside a single agent or two or more agents acting as a single processor) is regulated by a third processor.

The remainder of this introduction will summarise the regulated dialogue and its termination procedure.

Summary. The classification of a new case by an agent may be treated in one of two ways by other agents. First, all agents may accept the classification of the new case, in which situation the classification will have been accepted by common consent (and there will have been no reinterpretation of the concept taken from the precedent case) and the classification will be deemed to be reasonable on the definition outlined above.

Alternatively, another agent may either challenge the classification on its own terms (ie, without having constructed an alternative) or apply a different classification to the new case. There will then be a difference between those agents as to the classification giving rise to a difference in legal positions of the two agents. A difference will be contrasted with "an issue" (which is an inconsistency between two legal theories explained more fully below). The general idea is that a difference is a weaker, pre-decision condition. There may be a difference between two legal positions without there necessarily being an issue, as the difference may be resolved without issue. An issue will only arise if the two different legal positions cannot be resolved together.

Note that, under this description, consent is primitively defined as the absence of a difference. We are only concerned with what happens when there is a difference between two agents. However, we should also note that, under the procedure that we will describe below, if one of the parties to a dispute cannot maintain its position in that dispute under the procedure that applies to that dispute, then, its opponent is successful and it must consent to its opponent's classification (because it has no grounds on which to maintain a different position).

decision mechanism is required to break the cycle. The issue dialogue is also a regulated dialogue and it is regulated internally by the regulator.

The regulator level. The regulator level regulates the process level, as the name suggests. The regulator level carries out two main functions. First, it controls and records the argument moves that are put forward in the dialogues: our general idea is that the regulator constructs an argumentation framework, in the sense of Dung [34] from the arguments or argument moves put forward in the dialogue. This is explained in section 3.5 below.

Second, the regulator applies the decision mechanism to make a decision in a dialogue that has ended in deadlock and has thereby produced an issue as an output.

Levels of dialogue. The only levels of dialogue in the rational trial are difference dialogues and issue dialogues, however, those levels may be repeated. A difference dialogue takes as input one or more uninterpreted structures and an issue dialogue takes as input two contradictory legal sentences (that is, semantically closed structures). Note that this distinction may be confusing. Structures that are fully interpreted and closed into semantic objects at the object level will be input into a subsequent issue dialogue. However, if the dispute is raised up to a higher level again, by the appeal process, as described below, then it will be at a new higher level of generality with a different procedure and therefore, the structures taken from the level below will not necessarily be closed at that higher level.

We will also assume that, in terms of its subject matter, the dialogue can be 'about' any subject. For example, there may be a priority dialogue which would be about the order in which issues are input into the issue dialogue. The input into a priority dialogue would be a meta-difference or meta-issue (that is a difference or issue about other differences or issues) about which of a list of issues and/or differences should be decided first.

The second basic process is called a dialectic. The dialectic is a series of questions and answers by which a legal statement or an argument supporting the existence of a legal statement may be queried. Our basic approach of constructing a decision procedure out of the basic elements of the system analysis suggests that we could, as an alternative, construct an inquisitorial decision procedure using a dialectic as the basic process. Dialectic is only developed to a very limited extent in the rational trial. The general idea underlying this distinction between dialogue and dialectic, and our concentration on dialogue, is that the common law judicial process is adversarial rather than inquisitorial.

3.4.2 The Structure of the Processor

The idea for the structure of the processors that participate in the regulated dialogue is taken from an idealization of two disputants in court before a judge. It is a triangular graph with a node at each of the three corners and arcs between each of the bottom corners and the top one. The nodes are the agents involved in the rational trial and the arcs are channels of communication between them.

The agent at the top of the triangle is an idealization of the judge and the two agents at the bottom corners are idealizations of the disputants. There is no channel of communication directly between the two disputants, they are each only directly connected to the judge. The idea behind this is that in court, the disputants submissions are addressed to the judge, even though they may be directed at attacking the position of their opponent, in one form or another. The benefit to our description is that every statement made by either of the disputants passes through and can, therefore, be mediated and regulated by the judge. In our abstraction of the trial into the structure of the rational trial, we will call the top node the regulator level, rather than the judge.

This triangular graph can be replicated on both smaller and larger scales. On a smaller scale, we assume that the internal structure of each agent is also a triangular graph, this time with processors at each node rather than agents. This internal structure enables the agents participating in the rational trial to carry out the same processes internally to

themselves) as are being carried out "externally" in the dispute in which they are engaged.

This structure of the processor is used in three ways in the rational trial. First, when explaining how our description meets the requirements that it must be mechanical and plausible, the legal statements and arguments put forward by an agent in a dispute are constructed by that agent (internally) and, therefore, need not be taken from some pre-existing database. In the same way, the opinion of a judge, given in the decision is taken to be a product of that judge's internal reasoning.

Secondly, the two levels of the structure are used as a step by which the procedural level at which the dialogues are taking place can be raised to a higher level, repeatedly, if necessary.

Thirdly, on a larger scale, the two levels in the triangular structure can be seen as representing a step in the appeal process. In this context, the two object level nodes represent the *ratio* of the judge, being appealed, and some other *ratio* which the appellant asserts should be followed. The higher level node represents the higher court to which the appeal is made.

Legal Positions and the community of agents. Finally in this section, we will say something about how the triangular structure may be used to structure the community of agents. Remembering that an agent's legal position is the legal theory that it either agrees or consents to, we can see all those agents that have the same legal position (in the sense of either consent or agreement or both) as being a single processor. Two points follow.

First, the legal position has an internal and an external aspect. If there are a group of agents that have the same legal position, then any dialogue between those agents can be said to be internal to that legal position. Dialogue between those agents and others with a different legal position are "external" to those legal positions.

voluntary assumption of responsibility has been inside negligence) or two concepts may be subject to a two place predicate which explains their application (as, for example, happened to voluntary assumption of responsibility and contractual duty in Henderson – v- Merrett [14]).

Deadlock occurs when both disputants can maintain their positions and those legal positions cannot be rationalized together into a single theory.

When deadlock occurs in the difference dialogue, an issue arises and that issue is referred up to an issue dialogue. Where deadlock occurs in an issue dialogue, the deadlock must be referred to the decision mechanism to break the deadlock. The deadlock cannot be broken by the regulated dialogue alone.

Third, divergence ends the dispute when the parties' positions diverge to such an extent that the engagement between them threatens to exhaust the resources of the system. What we mean by diverging positions is that the argument moves put forward in the dialogues between the disputants raise more issues and differences than they resolve to such an extent that the dispute may never come to an end. In the rational trial, this condition is dealt with by limiting the resources available to the disputants. The idea for this is taken from the now common law procedural principle called "proportionality". This is described in Chapter 5, the general idea of proportionality is the system should devote an amount of resources to a case proportionate to that case's relative importance measured by factors such as the amount in dispute and issues, if any, of public importance that are raised.

3.4.4 A Difference Dialogue

The difference dialogue is an exchange of argument moves about the difference in question. The ideas underlying the difference dialogue are taken from the exchange of pleadings in the common law and from the type of argument moves made in related work in CBR, for example, CATO [1] which is discussed in chapter 4.

In CBR, under our analysis, the claimant makes a single argument by analogizing the new case to a precedent with the desired outcome (which is the claim) and the rest of the dialogue consists of 'moves' which effectively modify that initial argument.

The purpose of pleading, in the common law is to force the parties to 'join issue' on the facts. That is taken to mean, in more abstract terms, to find if and if so, where, in the legal space, the issue between them lies. The purpose of the difference dialogue is to establish whether or not, when the parties' respective positions are clarified and set out any maintainable difference between them.

Pleadings, under the modern common law, are supposed to be limited to statements of fact, albeit legally relevant fact, that is, fact that is sufficient to disclose a cause of action or to explain why it is not disclosed. Our conception of a difference dialogue is wider. Under it, any difference between the parties' positions can stand as input to the difference dialogue. For example, if they are both located in the same overall legal theory, but have different positions in it, then that difference may be referred to the difference dialogue.

One point that must be acknowledged in respect of the twin sources of the ideas for a difference dialogue is that they are not obviously compatible – we do not see CBR type moves, such as those made in CATO being made in pleadings and we do not see pleading type moves being made in CATO. Our answer to this apparent problem is that the dialogues are about different subject matters. Pleadings are about the facts of the case and the dialogue in CATO is about which precedent to follow.

The input into a difference dialogue is a difference. As explained below, in the rational trial, only one difference is input into each dialogue. There may be several or many differences between the disputants, but each difference will be input into its own dialogue. In the rational trial the order in which the differences are dealt with will be subject to a priority dialogue – see below. The number and type of differences between

the parties depends upon the richness and complexity of the theory in which the dispute is taking place.

The difference dialogue takes place at the disputant level in the triangular structure and when it is between the disputants it is external and must, therefore, be conducted in accordance with the rules of procedure that apply to that level of the appeal structure.

As explained above, there are three possible outputs, either an issue (which is the output if the dialogue ends in deadlock) or resolution (which is the output if the difference is resolved by argument in the dialogue) or divergence.

There are two types of resolution output. If the difference is resolved in the claimant's favour, then the next difference is called from the difference list and nothing is added and no change is made to the precedent argument. If the difference is resolved in the defendant's favour then the precedent argument is either modified to accommodate the difference, if modification is possible, or, if modification is not possible the application is withdrawn.

If the precedent argument is modified then the difference list is revised to take account of the modification.

3.4.5 An Issue Dialogue

An issue dialogue takes place at the regulator level, that is, in a dispute in court, it would take place as an internal dialogue conducted by the judge albeit that, in the common law judicial process this internal dialogue has been to some extent externalised in that the disputants make submissions in that dialogue.

The input into the issue dialogue is an issue together with the arguments that were put forward to support the parties' respective positions in the difference level dialogue that gave rise to the issue.

The output can either be rationalization or deadlock or divergence. Rationalization will be achieved as described above. Deadlock will result when both positions can be maintained. A decision mechanism will then be used to break the deadlock. Divergence results when the procedure does not lead to rationalisation or deadlock.

3.4.6 Dialectic

Dialectic is taken to be a reasoning process by question and answer. Examples of dialectical reasoning from the modern common law can be found in instances when the judge asks questions of the parties about their legal positions. It is an inquisitorial process as distinct from dialogue which, at least in the common law judicial process, is an adversarial process.

The primary process used in the rational trial is dialogue. However, there are two reasons to include dialectic as a separate reasoning process. First, under our assertion that the trial can take any form, a rational trial should be capable of containing any type of reasoning process and, therefore, we will include dialectic as an illustration of the inclusion of a type of reasoning process other than dialogue.

Secondly, and intuitively, it appears much easier to explain the construction of Lord Hershall's opinion in *Derry -v- Peek* [6] which is described in chapter 2 as the product of internal dialectic than as the product of an internal dialogue. This is because a dialogue tends to lead to a minimal theory and a dialectic tends towards a maximal theory. The idea being, that in a dialogue a party only needs to put forward sufficient arguments to defeat its opponent. Once that goal has been achieved, the dialogue is over and there is no need for the winning party to carry on adding arguments to its theory. Whereas, a dialectic, by the nature of its mechanism, tends to create a maximal theory in that in a dialectic, the questions need to be put until no more questions arise, otherwise, the inquisitor cannot be sure of the outcome of the process.

This idea of the construction of maximal theory construction by dialectic is well illustrated by the extended example of reinterpretation quoted in section 2.3, above from the opinion of Lord Herschell in *Derry v Peek* [6]. One can conceive of a dialogue which would construct that list of cases, but, intuitively, it seems much more likely to be the product of a dialectic in which Lord Herschell has recursively queried the precedent from which the rule in the precedent, presently under consideration, was taken, until he reaches the base or boundary case of the recursive process which is the first precedent. Lord Herschell's list of cases must be maximal, as there would have been no point in the exercise if he had not followed it through to its conclusion.

3.5 The Rational Trial

3.5.1 Introduction

This section describes the decision mechanisms, the configuration of the basic process and the part played by regulation in the rational trial. The main part of regulation used in the rational trial, that is regulation by use of an argumentation framework is described in section 3.6.

3.5.2 The Regulated Dialogue in the Rational Trial

The basic regulated dialogue is modified in two ways in the rational trial. First, the issue dialogue, which would normally be internal to the regulator is "opened up" so that it is carried out by submissions of the disputants.

Second, the regulated dialogue may be repeated up to three times to reflect the three levels of the appeal structure in the English common law. Any decision, in the first two levels of the appeal process, may be appealed if the disputant seeking to appeal can show that, with a minor change to the procedure being applied, it would be able to construct a legal position.

3.5.3 The Decision Mechanism in the Rational Trial

As we have described the rational trial, there is a difference dialogue followed by an “opened-up” issue dialogue and both those dialogue will be regulated from the perspective of “the reasonable agent”. However, we also need a decision mechanism to decide cases that cannot be resolved or rationalized by dialogue.

The fact that we have given priority to reason over authority in our definition of common law and in the rational trial means that we will use authority to break any deadlocks which arise in reason based processes.

Therefore, we must choose how to use authority in the rational trial to break deadlocks. In making this choice, there are three factors to bear in mind.

First, we want to use the decision mechanism and the fact that cases in which it is applied may become precedents in subsequent new cases, to keep the system “moving”, that is to enable the adoption of new procedures which will construct new substantive theories which will classify the changing domain and which will prevent the factually similar hard cases from arising again and again and again. In order to meet this requirement, we will say that our authority based decision mechanism will prefer one procedure over another.

Secondly, our example domain has suggested two alternative types of authority based decision mechanisms may be at work. The first is the pure authority based decision mechanism of *Oliver J in Midland Bank v Hett Stubbs and Kemp* [19], quoted above. This corroborates the procedure based approach mentioned immediately above. The second is the application of equity to mitigate the rigour of the common law. Since this thesis describes “pure” common law, we will not resort to the use of a competing legal system to stand as a decision mechanism in the rational trial. However, we will follow the lead suggested by the role of equity in the English common law, and accept that we need some mechanism by which the rigour of the common law is mitigated.

Thirdly, our analysis has suggested that there are three types of hard case, those in which a new law is to be created, those in which a law is to be extended and those in which there are two equally applicable, but, inconsistent laws. The conservative reason based decision procedure that we have described would not see the first two of these three types of case as hard. In the first one, the rational trial would always find that, from the perspective of the reasonable agent, no new law should be constructed. In the second one, the rational trial would never extend the law to the new example as to do so would be to depart from the status quo.

It is only when confronted by the third type of hard case that the rational trial would not be able to choose a conservative alternative.

We will take account of these three factors by saying that the decision mechanism of the rational trial is a quasi-random preference between two competing procedures which gives one of the procedures priority over the other.

3.5.4 Regulation

The primary method of regulating dialogue is by use of techniques taken from argumentation. These are dealt with in section 3.6 below. This section describes four other methods by which control might be exercised over disputes subject to the rational trial and one method which is excluded from the rational trial.

Meta-Differences and Meta-Issues. The main problem in the control of a dispute is managing the differences and issues between the parties. In the rational trial, this management could be subject to dialogue as a meta-difference or meta-issue, in this way it could be decided, for example, which of a list of issues should be heard first.

Procedure. There are procedural aids to the control of disputes, such as the principle of *stare decisis* which may enable a rationalization to be achieved where, in the absence of that procedural aid, none would exist.

A single input. A regulated dialogue is an exchange of arguments on a *single* difference or issue. This differs from the conventional conception of a dialogue which may be thought of as ranging over a variety of differences and issues that lie between two disputants. Under our conception the input to a dialogue is a single difference or issue and the output is either resolution of the difference and/or issue or a meta-issue or issues.

However, the difference between our conception of a dialogue and the conventional conception may only be one of form rather than of substance in that the same range of matters that might lie within the ambit of a dialogue, in the conventional sense, would simply be addressed in a series of dialogues, in our sense, following a series of differences.

We will define a regulated dialogue restrictively by reference to a single difference or issue to enable us to keep track of the progress of a dispute and for the rational trial to monitor its own behaviour (that is how many differences and/or issues there are to be settled and whether that number is increasing or decreasing).

Non-common law regulation. In our example domain, we see judges resorting to alternative types of interpretation as part of their decision procedures. Since we are describing a pure common law system, based on precedent, we will not incorporate these alternative interpretation relations in our description.

3.6 Regulation by Argumentation

3.6.1 Introduction

Argumentation is the study of the structure of and relations between arguments and the comparison of competing arguments. It addresses questions such as why one argument should succeed against another and so on. Therefore, it is obvious sense to use the tools used in argumentation in the regulator level of the decision procedure.

One of the formal tools of argumentation that has been used extensively in AI and law is the use of what is known as an argumentation framework ('AF' for short) of the sort that have been developed by Dung [34].

An AF is a highly abstract but representationally powerful structure in which to represent a dispute consisting of several different arguments that may attack each other. Since the operation of the rational trial involves a decision between competing and attacking arguments, it makes sense to use an AF to regulate the dialogues that take place in the rational trial.

The AF used in the regulator level is developed to carry out or participate in two main parts of the regulator's activities. First, it records the arguments put forward by the disputants (a conventional AF would not do this as the contents of arguments is abstracted out of it). The arguments recorded may then be used to construct the *ratio* of the decision. Second, it recognizes when a cycle has been created in a dialogue or when a dialogue is diverging away from consent to such an extent that it will exhaust the resources of the system. In which case it will either escalate the dispute to a more general level or impose a decision by the decision mechanism.

There are two further parts to this section. The next, section 3.5.2, will explain the basic ideas of the semantics and syntax of an AF. Section 3.5.3 will use ideas taken from AFs

to explain and develop the two parts for the rational trial referred to in the paragraph above.

3.6.2 The Semantics and Syntax of an AF

Semantics. Dung [34] summarises the idea of argumentational semantics as follows:

“Roughly, the idea of argumentational reasoning is that a statement is believable if it can be argued successfully against attacking arguments. In other words, whether or not a rational agent believes in a statement depends upon whether or not the arguments supporting this statement can be successfully defended against counterarguments. Thus the beliefs of a rational agent are characterised by the relations between the “internal” arguments supporting his beliefs and the external arguments supporting contradictory beliefs. This is quite different and at the same time inherently related to the mainstream approaches to nonmonotonic reasoning in AI and logic programming [cites some work on the semantics of logic programming and nonmonotonic logic] which are based on a kind of “internal stability” or beliefs (footnote – see below). These two kinds of “stability” are like two sides of the same coin. Their relationship is very much similar to the relationship between Hintikka’s game-theoretic semantics and Tarskian semantics of logic and natural language.”

In the footnote, Dung states: *“A set of beliefs is “internally stable” if it can “reproduce” itself. In other words, its stability is totally determined by the “internal” relations between its elements”.*

Thus argumentational semantics is based on the idea that an argument has a semantic value or meaning if it can be successfully defended against arguments that attack it. There are two yardsticks against which the success of the defense of an argument can be measured. First, it may only be considered successful if it can be defended against all possible arguments, which is the skeptical position, intuitively, the idea is that a skeptic will only believe the conclusion of an argument if there are no reasons not to believe it.

Alternatively arguments may be considered successful if there is a set of arguments that support the argument (even though there may be other sets of arguments that support a competing argument). This is the credulous position. The intuitive idea being that if I am credulous I will believe the conclusion of an argument provided that I can mount some tenable defence of it even if there are equally tenable reasons to reject it.

The application of argumentational semantics to common law is intuitively obvious. An agent will include a statement in its legal theory if it has reason to accept that statement. If the agent is credulous, it will accept the statement if there are reasons to support it. If it is sceptical, it will only accept the statement if there are no reasons against accepting it. Broadly speaking, the credulous condition applies when there are two competing theories being argued against each other in a dispute. However, if one of the disputants is unable to maintain its position, the dispute will be resolved and the semantic condition will change, in respect to that statement, to sceptical, since there is now no reason to argue against the successful theory.

The semantics of a statement which is subject to challenge can be explained in terms of argumentation semantics. Recall that in Chapter 2, the semantics of a statement were specified by reference to an interpretation relation between that statement and the precedents of the system, so the question immediately arises as to what ought value a statement can have if it is subject to challenge – should we believe that we ought to follow a particular conduct if others, for example, deny the existence of the statement on which that conduct is based or assert that there is another statement that should be followed in preference to the one that we have chosen.

Argumentation semantics provides a straightforward answer to this question that is coherent to our description as a whole. It is that we are entitled to believe our statement if we can defend it (applying credulous argumentation semantics). The dispute is of course the subject of the rational trial.

Syntax. An AF is a pair, $\langle AR, attacks \rangle$ in which AR is a set of arguments and $attacks$ is a binary relation on $AR \times AR$ under which, where A and B are arguments, $attacks(A, B)$ means that argument A attacks argument B .

Arguments in AFs are entirely abstract. We may assume that the arguments are expressed in some underlying logic which will also determine which arguments attack other arguments. AFs are not, however, concerned with the schemata of the arguments used in the framework nor with the different types of attack that there may be between different arguments. We will simply assume that if $attacks(A, B)$, then argument A is by some measure stronger than argument B and so if A is accepted then B is not.

It is easy to visualise an AF as a directed graph in which the nodes are arguments and the arcs between them are the attack relation. This will be particularly helpful to us as we are considering AFs that have been constructed by dialogue.

An argument, A , in an AF is said to be acceptable in relation to any particular sub-set of AR , ' S ', if any other argument that attacks A is itself attacked by some member of S . Intuitively, one can use the word acceptable to say that a conclusion of an argument is acceptable if the attacks on the argument supporting that conclusion are counter-attacked by other arguments.

Remembering what was said about semantics above, what we are looking for is a set of arguments, S , that give a rational agent grounds for believing the conclusion of an argument. Such a set is called 'admissible' perhaps because it admits grounds for belief. An admissible set is one which is both conflict-free (since a set in which one or more of the arguments attack each other is of no use to us) and of which all the members are acceptable, with regard to it.

The admissible set forms the basic unit for the study of consistent sets of beliefs, ' S '. There are three forms of ' S ' which are called grounded, preferred and stable extensions, each of which have various different characteristics, particularly in respect to their

computability, which is of particular interest to those concerned with using the formalism to specify a computer program. There are also various relations between the three types

3.6.3 Argumentation Frameworks in the Regulator of the Rational Trial

This section explains two aspects of the regulator level that rely on AFs, it then makes some comments on the ration of a precedent.

Level jumping. We have said that a dispute comes to an end by either rationalization or decision. The general idea of the rational trial is that it should, so far as possible accommodate the possibility of finding resolution before, in the absence of rationalization, a decision is imposed. We assume that if rationalization of two inconsistent theories is available it is to be found at a more general level. This assumption is corroborated by Prakken and Sartor when they say that a conflict between two arguments "*may need a justification by means of higher level argument.*" [22, page 11]. The AF gives us the mechanism by which a jump to a higher level of dialogue will take place.

In an AF, an inconsistency between two positions is represented as a circular cycle of attack relations. The simplest case is perhaps were two arguments attack each other. There are two forms of cycle, those with an even number of arguments and those with an odd number of arguments. They can be characterized as dilemmas and paradoxes respectively. An even cycle is, from the perspective of the disputants, a deadlock and, from the perspective of the arbiter of the dispute (assuming that there is one) a dilemma, because the arbiter must make a choice between the two sets of arguments and cannot chose both.

The general idea for the mechanism for level-jumping is that the progress of the dispute between the parties should be recorded in an AF and as soon as an even cycle appears in

that AF that cannot be broken by further argument from either side, it should be referred to a higher level dialogue.

Note that we have referred only to an even cycle. It is of course possible for there to be an odd cycle in an AF. An odd cycle is a paradox because, the arbiter cannot choose any of the arguments without rendering them all false. The question that immediately arises is why deadlock is common in the example domain of the common law and why paradoxes (with the possible exception of the sorites paradox – see Chapter 6) do not appear at all. Our speculative answer is that paradoxes are not seen because a disputant cannot put forward a paradoxical argument without attacking themselves.

Procedural decisions. The general idea as to how an AF could be used to trigger the decision mechanism being imposed in a new case is equally straightforward. It could happen in two situations. The AF will record the list of issues between the disputants, if that list is growing at such a rate that, to answer them will exhaust the resources of the system, then a decision mechanism may be triggered to prevent that from occurring.

As mentioned above, we could also have a more sophisticated type of issue management, again based on an AF. The idea here is that the AF would reveal dependencies between issues, that is, it would show that the outcome of one or more issues (the dependant issues) depended upon the outcome of other issues (which, following the terminology of modern common law procedure, we will call the preliminary issues). In such a situation it would obviously be more efficient to end the preliminary issues first as this may render it unnecessary to deal with the dependant issues at all. The actual dependency between issues may itself be the subject of dispute. As suggested above, it may then be the subject of a prioritising dialogue.

The second situation in which the state of the AF may trigger a procedural decision is simply when there is a deadlock and there is no higher level to which that deadlock can be referred by a level jump.

The ratio. Following the English common law, we will refer to the output of the rational trial as the ratio of the case. “Ratio” is short for ratio decidendi meaning the reason for the decision.

Since this chapter is concerned with the decision procedure of the system, it is appropriate to bring it to an end with some comments on the output of that procedure.

Under our analysis, the decision of a case consists of three parts, the outcome (that is, either for the claimant or the defendant), the legal statement which is a member of the pure substantive common law theory and the ratio which contains legally relevant factors which explain why the legal statement is a member of the substantive theory. For example, Lord Morris’ statement in Hedley Byrne quoted in Chapter 2 is a legal statement, the rest of his opinion contains the reason why that statement is a member of the substantive theory.

There are two points to note. First, in the English common law, the ratio often includes all sorts of arguments which, under our definition, we would not accept as common law reasons (because they are not precedent based) whereas our description is limited to a more limited conception of common law.

Secondly, it may be worth emphasizing the difference between what we have described as the pure substantive theory of common law and the ratio of any particular decision because of the possible confusion caused by the general application of the word “theory”. It would be perfectly acceptable to describe the ratio of a case as a theory (it is after all a set of sentences of some language). However, this would be a different type of theory from the substantive theory. The ratio is a structured theory of legally relevant factors. The substantive theory of common law is a set of statements all of which can be the argument of the legal predicate “it is law that ...”.

Following our discussion of argumentation frameworks, we will assume that the ratio of a case could be constructed from the arguments recorded in the AF and the relations between them.

This completes our description of the decision procedure which has been presented in this chapter as a combination of a process, the regulated dialogue and a decision mechanism. In the next chapter, we will review related work in AI and law and our earlier work in the terms of our description.

4. Related Work and Our Earlier Work

Introduction

This chapter sets out a review of three other pieces of related work and explains the earlier work that we carried out on analogy. The three main pieces of work are chosen as being representative of three important approaches in AI and law. The chapter also includes a more brief discussion of other contributions which have relevance to this thesis.

The three pieces of work reviewed are Alevén's CATO [1] as an example of a case based reasoning system, Gordon's Pleadings Game [9] as an example of a dialogue game and of a system using rules and Prakken and Sartor's system ('P+S' for short) [25] as the most fully realised attempt to date to replicate as much of a legal system as possible. The other contribution considered is the work by Bench-Capon and others [3, 6, 24] on value based systems.

In respect of each of the pieces of related work, we will summarise how they work and will then describe some of their main characteristics from the perspective of the system analysis.

Our earlier work focussed on developing an analogy mechanism which would enable a program, containing a database of precedents, to take a new case as input and give as output a decision as to whether or not the facts in the new case were sufficiently 'like' the facts in one of the precedent cases in order to be decided in the same way as the precedent case. It is an object based analogy mechanism.

The organisation of the rest of this chapter is straightforward: each of the three systems, the work on value based systems and our earlier work have a section devoted to them.

4.2 Case Based Reasoning and CATO

4.2.1 Introduction

CBR is, broadly speaking a method of solving problems in which “*a problem should be decided by comparing and contrasting the problem to precedent cases*”, Alevén [1, p.16]. It has been the subject of much research in computer science in various different sub-domains including medical diagnosis and information retrieval. Its use as a tool to model common law reasoning should be obvious from the similarity between the informal definition of it given above and the definition of the rule of precedent taken from Levi [14] and which is quoted in Chapter 2. The new problem can be seen as the new case, the previous solutions can be seen as available precedents and the extraction of the law from the precedent and its application to the new case is the specific method of solving the new problem.

If we look at CBR and at CATO as conceptual descriptions of the common law, what do we see? In terms of the system analysis, CBR is a simple transformation rule by which new cases may be transformed into precedents. It is a simpler and, perhaps a more fundamental transformation rule than that in this description, because it does not obviously contain the second step of this description’s transformation rule – the construction of a legal sentence from the facts of the precedent. It would be perfectly valid, within the scheme of a CBR system, to conclude that if the facts of the new case are similar to the facts of the precedent, then the outcome of the new case should be the same as the outcome of the precedent – in a pure CBR system, there is no need to construct a legal sentence from the facts of the precedent in order to reach this conclusion.

The example of CBR used is CATO [1], a CBR system developed by Vincent Alevén, whilst working as a PhD student under the supervision of Kevin Ashley. CATO owes much of its design to the earlier system HYPO [35] developed by Kevin Ashley for his PhD under the supervision of Edwina Rissland, but adds some notions (factors and the factor hierarchy), and de-emphasises others (most notably dimensions). We have chosen CATO because it is probably the most sophisticated

(in the sense of the number of argument moves that it can make) of the CBR systems that have been developed.

Conceptually described, CATO is a dialogue that is about the choice of precedent and which takes place in the context of a partial interpretation.

CATO is *“an intelligent learning environment designed to help beginning law students practise theory testing and argumentation tasks”* [1, page1]. Alevén’s first claim for CATO is that it is an aid to teaching legal reasoning to law students and the majority of Alevén’s work is devoted to and is motivated by this claim. It is not relevant to this thesis.

Alevén’s second claim is that

“An (interpretative) CBR program can effectively assess and explain the significance of distinctions between cases, generating arguments that they are important or not, by applying hierarchical background knowledge about the meaning of the surface level similarities and differences of cases. To do so it must compare the cases with respect to the background knowledge and strategically select the interpretations of cases (“focal abstractions”) on which to focus. This results in plausible arguments that are sensitive to context, that is, the cases being compared and the arguers view point.” [1, page 12]

It is the part of Alevén’s work that is devoted to establishing this secondary claim that is relevant to this description. There are three particular characteristics of CATO that we will concentrate on: first, the argument moves that can be made in the system and the schemata of arguments implied by these moves; second, the use of factors (which are *“legally relevant facts”*); and, third, the use of a hierarchical structure, Alevén’s Factor Hierarchy, as a context in which to reason with cases.

There are two specific points that deserves to be made at the outset. First, it is not any part of Alevén’s aim to explain how new cases are decided. He focuses on the mechanism by which argument moves may be made, using cases, that argue either for or against a particular conclusion in a case, he is not concerned with the

mechanism by which competing arguments are arbitrated. This issue is addressed by a system, IBP [5] (Bruninghaus and Ashley), developed from the CATO system which will also be summarised below.

Second, CATO contains a great deal of prior expert analysis of its example domain. Whilst this may be perfectly acceptable within the primary aim of CATO, it is very much against the spirit of this description which seeks to provide a conceptual explanation of common law sufficient to enable practical implementations to be built without the need for large amounts of expert analysis.

The next section will summarise how CATO works, then, the following section will explain three characteristics of CATO from the perspective of the system analysis.

4.2.2. How CATO Works

CATO is a model of CBR in law, in which the problem to be solved is usually, under the particular facts of the new case, whether or not the Claimant is entitled to the legal relief or remedy that it is claiming. CATO, like HYPO before it, takes US Trade Secrets Law as its domain. In the CBR model, a problem is solved by the application of the solution that has previously been used in a precedent. However, a further problem arises when there is more than one precedent that is applicable and those applicable precedents imply inconsistent conclusions or where there is only a partial match between the facts of the new case and those of the precedent. This is often the situation in legal disputes and covers two out of the three types of hard case identified in Chapter 1. (The third type of hard case - a dispute as to the existence of a law, does not arise in CBR cases, because CBR does not deal in laws).

It is these situations, in which a dispute arises, that Alevin is interested in. He explains that in these situations *"Each party tries to justify a decision in its favour by showing that the facts of the current case are similar to those of past cases decided in favour of that same party and that they are dissimilar to the facts of cases that were won by the opponent. ...The parties reason about the significance of similarities and differences among cases by relating them to abstract legal knowledge"* [1, page 17].

CATO models this situation by setting up a dialogue between the disputants (that is an arrangement under which the parties take it in turns to make argument moves in relation to the similarity or difference between the new case and the precedents. This dialogue has three turns: the citation of a precedent; challenges to the precedent by the opposing party, and a response from the original party to these challenges. This three-ply structure was adopted from HYPO. CATO provides eight different argument moves that are available for the parties to use during that dialogue.

The dialogue between the disputants is about the similarity and distinction between the new case to the precedent or precedents. CATO attributes to the disputants, the basic strategy that they should emphasise the strengths and down play the weaknesses of their position. CATO's eight argument moves are:

1. analogising a problem to a past case with a favourable outcome;
2. distinguishing a case with an unfavourable outcome;
3. downplaying the significance of a distinction;
4. emphasising the significance of a distinction;
5. citing a favourable case to emphasise strengths;
6. citing a favourable case to argue that weaknesses are not fatal;
7. citing a more on point counterexample to a case cited by an opponent;
8. citing an as on point counterexample.

The argument moves that are available to the parties are instantiated (that is, actually used in a specific dialogue) by being made to refer to factors. Factors are, broadly speaking, legally relevant facts – we will say more about them below. For example, the first argument move referred to above, analogising to a past case, might be instantiated by showing that the new case and the precedent both contain the same factor.

However, this immediately raises two questions. First, in the context of a dispute, how do we decide upon the relevance and relative weight of a particular factor – when is it sufficient to establish the precedent and the major premise in the CBR

argument schema, and when will it outweigh the application of a factor from competing precedent.

Second, how are competing precedents managed – how in a dispute in which there are multiple precedents that may be applicable, are those precedents prioritised – how do we know which is the defining precedent – that is the one, be reference to which the claim will actually be decided.

Aleven addresses both these questions by reference to a factor hierarchy. Again, this is a characteristic of CATO that we will comment on further in more detail. The general idea is that factors are organised into a partial ordering based on a mixture of increasing generality (the higher up the hierarchy, the more general the factors) and background expert knowledge of the domain of application of CATO, based on its description in the American Law Institute's Restatement of Torts.

By reference to the factor hierarchy, one factor may be given more weight than another, because it is more general, in terms of the hierarchy, precedents may be organised and managed, in a multi-precedent dispute, by the factor in the hierarchy that they refer to.

4.2.3 IBP

IBP [5] (“Issue Based Prediction”) is a system developed partly from CATO by Ashley and Bruninghaus in which case based reasoning is combined with reasoning using an abstract domain model in order to predict the outcome of case based disputes.

IBP consists of a set of precedents represented as factors and a “*high level logical structure of the legal domain*” (“the logical structure”). IBP's example domain, like CATO's is trade secret law. The logical structure for trade secret law used in IBP is as follows:

argument schema, and when will it outweigh the application of a factor from competing precedent.

Second, how are competing precedents managed – how in a dispute in which there are multiple precedents that may be applicable, are those precedents prioritised – how do we know which is the defining precedent – that is the one, be reference to which the claim will actually be decided.

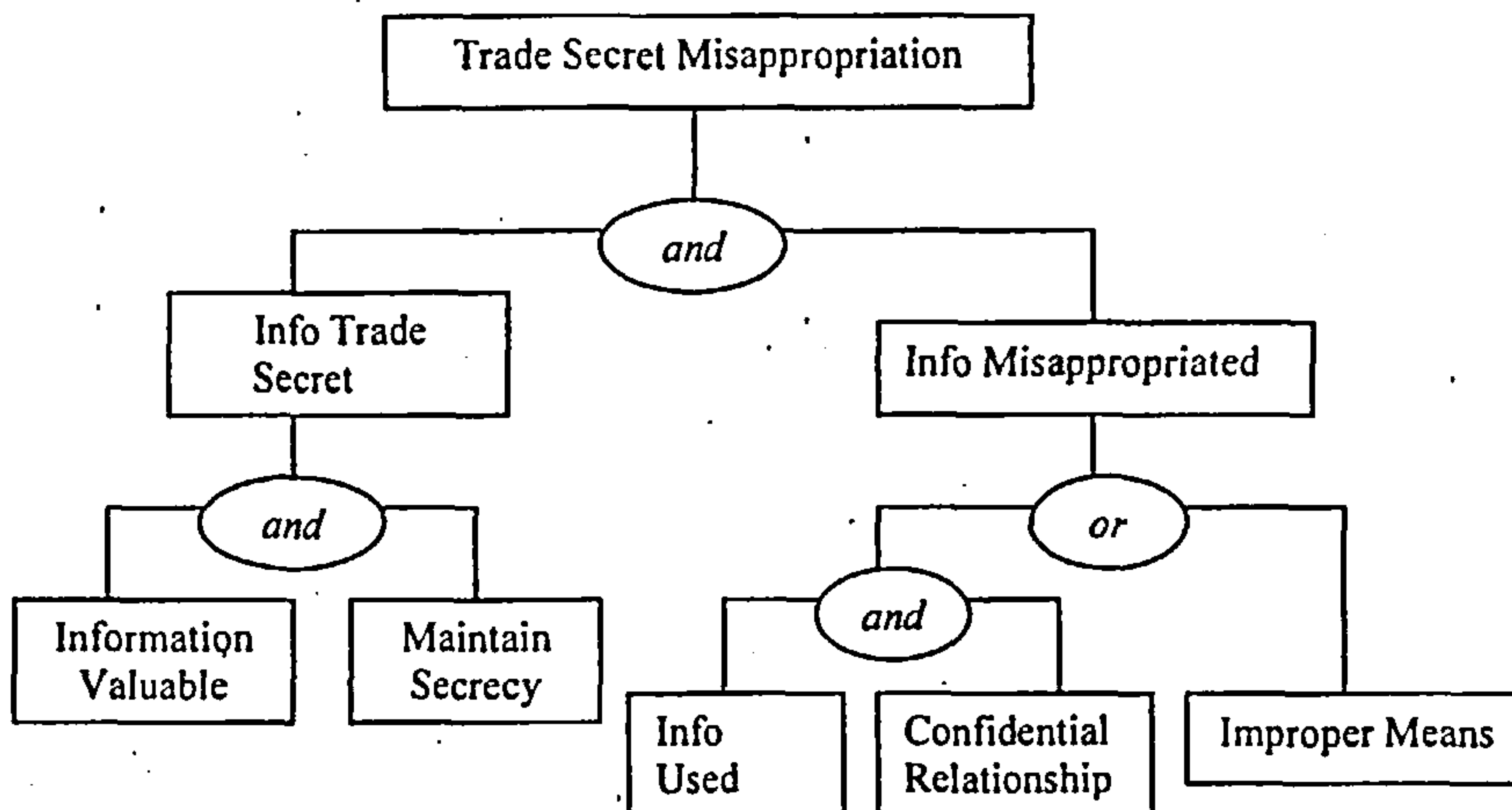
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It will be seen that there are a total of 7 issues in the logical structure. Each of IBP's factors are causally related to one of these issues.

The most important difference between this domain model and the factor hierarchy (which is CATO's domain model) is that IBP's model contains some logical relations between issues, whereas the links between factors in CATO's factor hierarchy are purely evidential.

The making of a prediction by IBP can be described as a 3 step process. First, the issues in the new case are identified. Secondly, it is determined which of the disputants are favoured on each of the issues. Thirdly, the outcome on each of the issues is combined to give, if possible, an overall outcome.

IBP identifies the issues in the new case by taking the factors by which the new case is represented and finding the issues in the domain model to which those factors are causally related.

Each of the factors in the domain model is deemed to favour either one or the other of the disputants. The determination of which disputant is favoured on each issue (ie, step 2) is carried out by reference to those factor preferences.

If all the factors related to a simple issue favour one or other of the disputants, that disputant is predicted to succeed on that issue. If there are competing factors in

respect of an issue, then IBP carries out a procedure called "Theory Testing", by which all the precedents in which the competing factors exist are retrieved. If all these precedents are in favour of one or the other disputants, then this is taken as good reason that the new case should be decided in favour of that disputant (IBP includes refinements on Theory Testing which we will not explain here).

If IBP cannot resolve competing factors in respect of a specific issue, it simply abstains from making a prediction in respect of that issue.

In the third stage, the outcome of each of the issues is combined into an overall outcome.

4.2.4 CATO and IBP under the System Analysis

This section explains two characteristics of CATO from the perspective of the system analysis. Those characteristics are argument moves and factors and the factor hierarchy. We will then make some comments on IBP.

Overall, under the system analysis, CBR is a type of transformation rule and CATO is a type of difference dialogue.

Argument moves. There are two points to make about argument moves. First, that they fit the description of a difference dialogue in that the first of those moves is the claim which is a complete argument and the other seven are moves about the precedent that is used in that claim. (Note that this is not strictly correct in respect of the second of CATO's argument moves which might be more intuitively described as a complement of the first move, but we will treat that as a subtlety that does not trouble our central proposition).

Under the description of a difference dialogue, the moves and the claim in the dialogue are given their interpretation by the outcome of the dialogue. If and when an outcome is achieved (even if it is only an issue between the disputants), then the argument moves put forward by the disputants can be developed into arguments grounded in those competing interpretations.

The transformation rule of CBR is stated in the first of CATO's eight argument moves. It could be re-cast as in the following schema.

MINOR PREMISE: New case containing fact X.

MAJOR PREMISE: Precedent containing fact X and decision Y.

CONCLUSION: New case contains decision Y.

The difference between the schema and the schema for the transformation rule used in this description and set out in Chapter 2 is obvious. Our transformation rule has an additional premise in which the law taken from the precedent is stated.

Factors and the factor hierarchy. In CATO the law is represented as factors. Alevén defines factors as "*stereotypical collections of fact that tend to make a case stronger or weaker for a side*" [1, page19]. Examples of factors used by CATO from the domain of trade secrets law are "*information known to competitors, information-reverse – engineerable, agreed not to disclose and security-measures*". The factors used in CATO are the product of prior analysis of his example domain by a human expert in that domain. Under our analysis, factors may be incorporated into the legal theory but are not necessarily incorporated. A review of our example domain suggests that only a small fraction of them are incorporated. That is, there are many legally relevant facts but, only a few of them are ever incorporated into the legal theory by semantic closure – a fact reflected in the logical structure used in IBP where the logical structure may be treated as a theory that has many factors attached to it.

Under the system analysis, we would expect factors to be the product of a difference dialogue about the facts of the case of the sort that is carried out through the modern process of pleading.

The factor hierarchy is a hierarchical structure representing "*expert knowledge about the meaning of factors, relating them to more abstract concerns and legal issues...CATO uses the Factor Hierarchy to identify issues in problems or cases,*

organize multi-case arguments, and to reason about similarities and differences among cases." [1, page 44].

CATO's factor hierarchy is a context which gives its factors an interpretation to the extent that they support or detract from the existence of more general factors. This context is needed to construct more complex argument moves.

The factor hierarchy has competing interpretations written into it in that "*each high level factor stands for two opposing conclusions, one favouring plaintiff, one favouring defendant.*" [1, page 45]. This enables competing interpretations of new cases to be constructed.

The factor hierarchy is also used to separate issues which were mixed in HYPO: HYPO made no distinction between factor arguing that the information was a secret from those relating to improper means on obtaining it. This separation into individual issues is a part of our analysis. Note that this separation is further developed by the logical model of IBP.

IBP. We will make one point about IBP in respect of its logical structure.

Under the system analysis, the logical structure used in IBP is a schema for a cause of action in that it sets out the elements that must be proved in order for the claimant to succeed on its claim. The issues are what we might call the elements of a cause of action, as distinct from the sense in which the word 'issues' is used in this thesis to refer to an inconsistency in languages.

4.3. The Pleadings Game

4.3.1 Introduction

This section looks at an example of a rule based system and of a dialogue game, Gordon's Pleadings Game [9].

Rule based systems. The representation of the law in the Pleadings Game is an example of a rule based system, in that the law is represented as a set of rule structures called defaults. A default is, broadly speaking, a general rule with an exception or exceptions, the general idea being that the law is represented as a set of general rules with exceptions. One default can stand as an exception to another. Under the particular type of default logic used by Gordon, one default is an exception to another, and therefore applies in place of it, if the first is more specific than the second.

A dialogue game. In formal languages a dialogue game, following Lorenzen [15] is a type of theorem prover, the general idea being that, subject to appropriate procedural 'rules' of the game, a player in a dialogue game will be able to defend a sentence of a particular formal language if and only if it is a theorem of that language. Where the focus of CATO's use of dialogue is argument construction, the focus of the pleadings game is on the rules by which the dialogue is conducted.

Gordon takes the conventional idea of a dialogue game and, again broadly speaking, develops it into a model of the pleadings stage of the judicial process. "*The Pleadings Game is a formal, normative, model of a particular type of legal proceeding*" [9, page 239]. It is formal in that it is a completely specified system. It is normative in that legal norms are represented and manipulated by the system and it is based on the old common law style of pleading in which the parties alternated in putting forward statements of their cases each, after the initial statement, in answer to their opponent's prior statement, until neither of them had anything further to say. Gordon uses this iterative pleading process as a model for a dialogue game. However, the specific aim of the Pleadings Game is not to prove a theorem of any particular language, but to identify issues between the disputants.

The wider aim of the Pleadings Game is to examine the extent to which judicial discretion can be constrained by mechanical control of the issues that are put before the judge for final decision. Gordon examines this question by taking the procedural rules that apply to the parties in the Pleadings Game (and thus define which issues it is that will arise - because different procedures will find different issues) from Alexy [2]. Alexy put forward the discourse theory of legal argumentation in which he

proposed a set of procedural rules which legal discourse ought to follow. Examples of those procedural rules are 'no speaker may contradict himself', and 'everyone may problematise [ie, challenge] any assertion'. Gordon takes some of Alexy's procedural rules for legal discourse and develops them into the procedural rules for a dialogue game.

The purpose of dialogues in the rational trial is to find an interpretation or the absence of an interpretation in the form of an inconsistency. This purpose can, broadly speaking, be described in terms of the conventional idea of a dialogue game – the legal theory being asserted by the Claimant stands as the 'theorem' to be proved, if the Defendant cannot maintain its legal position then the 'theorem' is 'proved' (and there is an interpretation in which that theorem is proved). If the Defendant can maintain its legal position then an issue between the two positions of the disputants has been discovered. However, the idea of proving a theorem carries with it the suggestion that that theorem had some existence prior to it being proved, whereas, the idea underlying the description is that the dialogue plays a part in constructing the interpretation in which the theorem can be stated, and there is no suggestion that that theorem had any prior existence.

As with CATO, it is not part of the Pleadings Game to decide the issues that have been identified, although Gordon does briefly specify what he calls the Trial Game in which the issues that have been identified in the Pleadings Game are decided. However, since his purpose is to investigate constraints that control which issues it is that the judge must decide, rather than the method by which the judge decides them, the Trial Game is not developed in any detail simply allows the court to decide the issues presented to it either way.

Section 4.3.2 will summarise how the Pleadings Game works. Section 4.3.3 will describe some parts of the Pleadings Game from the perspective of the system analysis.

4.3.2. How the Pleadings Game Works

The general idea of the Pleadings Game is of a system that mediates the exchanges between two agents both of whom use the same language (based on conditional entailment) but between whom there may be different interpretations of the statements of that language. The Pleadings Game identifies those differences of interpretation which are referred to in the Pleadings Game as issues.

We will describe how the Pleadings Game works, in general terms in three parts, the language used, the procedure of the dialogue game and the control and termination conditions. This broadly follows the structure of [9].

The language. In the Pleadings Game law is represented in a language based on a type of default logic called conditional entailment.

The attribute of conditional entailment that distinguishes it from other types of default logic is that priority of application between competing defaults is ordered by specificity, that is, a more specific default defeats the application of a more general one. Therefore, law can be represented as general rules with more specific exceptions. One point to note about defaults is that they are also general rules in the sense that they contain variables, and so they cannot be applied until they have been instantiated by having their variables replaced by closed terms of the language. These are referred to 'uninstantiated defaults' and 'default instances' respectively.

One of Gordon's examples of a priority relation between two defaults is that a rule relating to consumer goods would take priority over a rule relating to non-specific, general goods.

A default has the structure 'IF *antecedent*, THEN *consequent*', where *antecedent* and *consequent* are sentences of the language.

The semantics of a language written in conditional entailment is based on a monotonic consequence relation, by which it could be asserted that any particular sentence of the language could be stated to be unconditionally valid, in the same way

as a statement in 'some monotonic classical logic (we will refer to this as unconditional entailment'). Although some of the sentences of the language may be unconditionally entailed, a sentence of the language that is the consequent of a default will only ever be conditionally entailed if the default is applied, its antecedent satisfied and it is not overwritten by a more specific sentence. The general idea of conditional entailment is that a default may subsequently be contradicted by the further application of a more specific default which proves that the sentence is not valid. For example, a conditionally entailed sentence of the language stating that a professional owes a duty for a voluntarily given reference would be invalidated by the application of another default stating that if a reference is given by a bank manager, then no duty will exist.

The general idea is that some laws and a domain to which those laws apply are represented as a default theory, written in the language of conditional entailment. A default theory is a pair consisting of:

- i. background information which is also a pair consisting of (a) a set of unconditionally entailed sentences of the language which represents non-defeasible information about the domain and (b) a set of uninstantiated defaults which represent the general rules of law that can be applied to that domain; and
- ii. a set of sentences representing the case specific evidence which may be either unconditionally or conditionally entailed. This represents information that may have been derived from the prior application of a default and therefore, is defeasible.

The uninstantiated defaults of the theory can then be instantiated, using sentences and terms taken from the background information and case specific evidence to conditionally entail further sentences.

Gordon explains, as a matter of knowledge engineering, how he uses a default theory to represent statutory law by mapping the various types of exceptions found in his

example domain onto the specificity relation used in conditional entailment to order defaults.

He also explains his decision to represent all rules, including rules about other rules, in a single object level. Again, this is a pure knowledge engineering decision. He is not concerned with conceptual implications that have occupied us in the description set out in this thesis.

The Dialogue Game. Equipped with a default theory, described above, Gordon explains how a sentence of that theory, which he calls *the main claim* is subject to the procedural part of the Pleadings Game.

As mentioned above, the purpose of the procedure is to find the issues. In the Pleadings Game, an issue is any sentence that is relevant to proving the main claim, which cannot be conditionally entailed from the theory (note that Gordon's use of this word is different from that used in this thesis). We will come back to issues when we look at control and termination below.

The procedure takes place against a *background context* which is a triple, consisting of:

- the main claim, that is the sentence that the Plaintiff would like to prove;
- a set of sentences of the theory that are accepted and agreed by both players of the game; and
- a set of uninstantiated defaults that are also accepted and agreed by the players of the game.

The game consists of alternating moves being made by the Plaintiff and the Defendant, who are the players of the game. The Plaintiff's main claim is contained in the background context and, therefore, it is the Defendant who takes the first move.

The moves that can be made by the players are *assertions* about *statements*. There are four types of statement, a claim about a sentence, an argument about a sentence, a

rebuttal of an argument about a sentence and a denial of a previous an opponent's prior statement. There are four types of assertion, concessions, denials and defences of statements and declaration of an instantiated default.

The statements of the players are recorded on *the record* which is a triple, consisting of:

- the background context, described above;
- the statements asserted by the Claimant; and
- the statements asserted by the Defendant.

Each of the statements of the two parties are divided into three sub-types, *open statements* which have not yet been responded to by the opposing party, *conceded statements* and *denied statements* which have been responded to by the opposing party and have been either conceded or denied by it.

There is one general rule and ten specific rules that constrain the moves that the parties can make at each turn that they take. The general rule is that a party is required to answer every relevant statement at each turn. A relevant statement is one which is about an issue. The ten specific rules are based on Alexy's rules for legal discourse, mentioned above.

Termination and control. As mentioned above, at each turn, each player must answer all its opponent's relevant statements. The game comes to an end when there are no more relevant statements to answer. The Plaintiff wins the game if the main claim is conditionally entailed and there are no outstanding issues. The Defendant wins the game if the main claim is not conditionally entailed and there are no outstanding issues. If there are outstanding issues, then neither party has won and, the dispute must proceed to be decided by the judge. Gordon sketches out an idea for a Trial Game in which outstanding issues are decided. Under that sketch, the judge is free to decide to decide the issues however it pleases. However, one of the characteristics that Gordon hopes to illuminate, by the Pleadings Game is the extent to which judicial discretion is constrained by mechanical procedure such as pleading, his point being that the judge is not free to chose which issue it decides, but is constrained to decide only those issues put before it by the procedure.

Gordon describes the outcome of the Pleadings Game in terms of a legal procedure known as summary judgement under which a party in litigation can bring proceedings to an end at an early stage with judgement in its favour if it can show that, broadly speaking, in the case of the Plaintiff, no arguable defence is possible to the claim and, in the case of the Defendant, that the Plaintiff has failed to make out a cause of action and therefore, must fail.

4.3.3 The Pleadings Game under the System Analysis

This section discusses the Pleadings Game in terms of the system analysis and the wider description of the law contained in this thesis. It looks at two parts of the Pleadings Game, the way that the law is represented and the dialogue game used.

The representation of law. The domain of the Pleadings Game is primarily statute law, although it also deals with other types of law such as the procedural rules which establish priorities between competing substantive rules. All those rules are represented as object level defaults. In the terminology of the system analysis, the law is represented as a system of rules. The Pleadings Game is not concerned with how those rules are given their interpretation.

In the Pleadings Game, all the rules are represented on the same object level. In our description (which is a description of common law as a set of sentences, rather than of a system of rules), the common law is represented on two levels, the function level and the first order predicate level (albeit that we would accept that the functions of the theory can be nested. The real use of levels, which look so intuitively obvious when looking at the law from the point of view of the knowledge engineer, in the system analysis, is in the decision procedure rather than in the statements of the law to which that procedure applies.

The Dialogue Game. Under the system analysis, the procedure used in the Pleadings Game is an issue dialogue about rules. It is an issue dialogue because the disputants bring to the dialogue two complete interpretations, albeit it may transpire (if one of the parties is successful against the other) that the two interpretations are

not inconsistent. It is about rules because the law is represented as rules in the Pleadings Game.

The similarity between the Pleadings Game and this description should be obvious. They both use a dialogue to determine the existence of issues and, in both, issues are inconsistencies in the language. We will comment on two aspects of this similarity, the underlying conception of a dialogue and the rules that define the dialogue game.

The underlying formal conception of a dialogue game as theorem prover is compatible with the conception of a dialogue which underlies this description (that is, as a reasoning process that is pursued in the decision procedure). However, there is an obvious difference of context. In a formal system, these would be a pre-existing interpretation in which the validity of theorem is decided. In this description, the dialogue is used to find whether or not there is a consistent interpretation.

The rules that define the dialogue in the Pleadings Game are developed from Alexy's rules for a discourse. These appear to be generalised abstractions or minimum requirements for a discourse. However, in a system in which interpretation is not fixed, even the most intuitively obvious of the rules (such as the two quoted above) may not apply. For example, in respect of the rule "No speaker may contradict himself", an agent may contradict itself in at least three senses. First, an agent may change its legal position, to a contradictory position over time by operation of the system. Second, insofar as an internal dialogue within an agent may produce an issue, that agent might be described as contradicting itself. Thirdly, an agent that does not have a position in respect of an issue between two other agents (such as the judge in the rational trial) may hold the contradictory positions and may rationalise them together.

In contrast to Alexy's abstract formulation, the rules that define the dialogue in this description are specific to the system as it is configured for the time being in at least two ways. First, the procedural law is closely coupled to the substantive law (we will see, in Chapter 5, that in the early common law, the substantive and the procedural

law were not distinguished from each other). Therefore, a change in one leads to a change in the other.

Secondly, under the system analysis, reasonableness and rationality have system and context specific meanings. What is reasonable or rational in one system or context may not be in another. For example, trial by ordeal, as described in section 3.3 above looks (to me, at least) unreasonable and irrational, even as an authority based decision mechanism. However, it may not do so to others, particularly the agents of that particular system.

4.4 Prakken and Sartor's Model

4.4.1 Introduction

Prakken and Sartor describe their Model [22] ('P+S' for short) as an abstract formal framework for assessing legal arguments. It aims to bring together and integrate parts of CBR of which CATO is an example, parts of rule based systems and parts of argumentation. Their aim is to use a system of defensible argumentation as a tool for "*connecting and integrating the two research developments [ie, CBR and defeasible reasoning]*".

They state that there are three main ideas that underlie P+S [22, page 26]. First, that it should have what they call a dialectical setting. This refers, broadly speaking, to some sort of forum in which arguments can be exchanged and compared. They use a dialogue game as the dialectical setting in P+S. Secondly, it must be possible to introduce new premises into a dispute as it progresses. They seek to achieve this by permitting the antecedents of the rules of the system to be changed during the course of the dialogue. Thirdly, they represent the law as a set of precedents each of which is a set of possibly conflicting rules together with, if necessary, a priority rule stating which of the conflicting rules take priority over the other in order to produce the result in the precedent case.

In respect to the use of precedents in decision making, P+S addresses three orders of problem. The first is the structure of the basic argument moves that can be made

Information about priorities between rules is also represented as a rule and thus may be disputed just like any other rule.

There are two types of defeat, weak defeat (which is referred to simply as 'defeat') and strict defeat. Strict defeat occurs when one rule defeats another, but not vice versa. Defeat occurs when one rule defeats another and vice versa. P+S makes use of this feature in its decision procedure, discussed below.

Rules are contained in cases. A case is a set of, possibly conflicting rules of the form '*if Factor X, then Outcome P*' where X is one or more legally relevant facts from the precedent and P is either the Plaintiff or the Defendant in the precedent. Where a case contains conflicting rules, it also contains a priority rule which gives the rule or rules in favour of the actual outcome priority over the rule or rules in favour of the opposite outcome.

Information is input into P+S in the form of an ordered theory, which is a set of strict and defeasible rules which represent the facts of the new case and some of the rules that may apply to it. (It is only some of the rules as further rules may be added as the process goes on). The theory is ordered in that the defeasible rules are ordered by reference to a defeat relation that says that one defeasible rule takes priority over and hence defeats or is defeated by another). The claiming party's claim must also be in the ordered theory.

The decision procedure. The decision procedure in P+S is a dialogue game in which the two parties take it in turns to put arguments that attack their opponent's immediately forgoing argument. An argument is a rule from the language. The dialogue game is subject to a bias which is called 'dialectical assymetry' (and which is discussed in more detail below), by which, in order to be successful, arguments put by the party that first makes the claim (the Plaintiff) must strictly defeat the responding party's (the Defendant) arguments, whereas the Defendant's arguments need only defeat those of the Plaintiff. P+S appears to use this bias to promote decisions – if both parties' arguments had to meet the same criteria, deadlock would be more common.

There are three ways in which one argument may defeat another, undercutting, exclusion and rebutting. One argument undercuts another by showing that one of its premises does not hold. One argument excludes another by having as its conclusion that that other rule does not apply. One rule rebuts another where the two rules have contradictory consequences.

The dialogue game in P+S takes account of all the ways in which arguments interact and therefore recognises that an argument that is defeated by another may subsequently be reinstated if the defeating argument is itself defeated by a third argument. Taking all possible interactions into account, arguments are divided into three classes, justified, overruled and defeasible. A justified argument is one with which a dispute can be won, an overruled argument is one which will be defeated and a defeasible argument is one that will leave the dispute undecided.

Assuming the dispute concerns a claim by the Plaintiff that a particular fact is entailed by the ordered theory (together with any other rules that are added to the theory during the dialogue), a proof that a claim is justified takes the form of a dialogue tree which has as its root an rule entailing the claim. Each branch of the tree is a dialogue. Each turn taken by the players consists of putting forward an argument based on some given ordered theory.

The Plaintiff wins the dialogue game if the Defendant cannot put forward an argument when it is its turn to do so. The Defendant wins the dialogue game if any of its arguments defeat one of those of the Plaintiff. This is broadly similar to the decision procedure that we have used in the rational trial, where one disputant wins if the other fails to maintain its position, although the rational trial does not have any bias analogous to dialectical asymmetry. P+S also gives the status of the arguments that have been used in producing a particular outcome in the three ways referred to above (that is, justified, overruled and defeasible).

As described so far, P+S is a rule based system, albeit those rules are contained in and derived from precedents. However, cases are used in the decision procedure of P+S as a way of introducing new arguments into the dialogue game. The players may introduce rules by analogising or distinguishing a precedent. A rule in a

precedent is analogised by having one or more of its antecedents omitted (the general idea being that a rule with, say two antecedents is likely to be more broadly applicable than one with, say three antecedents and therefore, it is somehow permissible to omit an uninstantiated antecedent in order that the rule as a whole may be applied).

A rule in a precedent that has been broadened may be distinguished by an argument that concludes that if the omitted factor cannot be proved then either the opposite conclusion holds (which is called strong distinguishing) or that the broadened rule is inapplicable (which is called weak distinguishing).

P+S deals with competing precedents by adopting a mechanism from HYPO of 'on-pointedness'. Broadly speaking, one precedent is said to be more on point than another if it shares more factors in common with the new case than does another precedent. A more on point precedent takes priority over a less on point one.

4.4.3 P+S under the System Analysis

We will comment on three characteristics of P+S, its four layer concept, synthesis of case based and rule based systems, and what we will call Prakken and Sartor's 'engineering approach'.

The four layered model. P+S is built on the conceptual foundation a four-layered picture of legal argumentation that has been developed by Prakken and Sartor in an earlier papers [22]. The general aim of the four-layered picture is to provide a framework in which legal argument can be analysed. This is similar to the goal of this thesis, however, whilst the conception of the law in this thesis is constructivist, Prakken and Sartor's conception is logicist because it takes as axiomatic some form of entailment. The fundamental difference is that in our constructivist conception, the interpretation on which the consequence relation is grounded is constructed by the operation of the system. In the logicist conception it is given. The four layers are as follows.

The first layer is logic, by which is meant a language in which individual valid arguments can be constructed by which conclusions are entailed from premises. The logic layer provides the objects to be evaluated in the dialectical layer. The second is the dialectic layer in which conflicting arguments can be set against each other and compared. It offers to the procedural and heuristic layers a way of assessing whether or not a new argument may be relevant. The third layer is the procedural one and regulates how a dispute is conducted. It differs from the first two layers in that, in the procedural layer premises can be constructed dynamically during a debate, whereas the first two layers are assumed to have a fixed set of premises. The final layer is the strategic or heuristic layer which provides rational ways for conducting disputes within the procedural bounds of the third layer

Broadly speaking, the constructivist conception of the law which underlies this description, treats the four layers as being inverted. It begins with a law being formed motivated by the self-interest of an agent (ie, P+S fourth, strategic layer) using whatever internal procedure will enable that agent to achieve its goal. If challenged, the parties will engage in dialogue (the procedural layer in P+S) with any deadlocks that arise being put to the decision procedure (ie, P+S second, dialectic layer) and the outcome will be a semantically closed statement on which an argument can be grounded (ie, P+S first, logical layer).

The synthesis. Our description is similar to P+S insofar as they both attempt a synthesis of rule based and case based systems (albeit this is not the express aim of either work).

The synthesis in this description is attempted by reference to a classification language. The general idea is that precedents give a theory of that language its interpretation and rules can then be expressed in that theory. The theory in one form or another is then used to classify new cases.

In P+S the synthesis is approached by representing cases sets of rules, as "*a completed or frozen piece of argumentation, ie, as a dialectical argument structure*" [22, page 3], used primarily as a vehicle by which new rules may be introduced into a dialogue while it is being conducted. Under Prakken and Sartor's four layer

analysis, it is a synthesis in the dialectical layer. Under the system analysis, the statement of rules in cases would amount to judicial legislation. P+S assumes that rules consist of factors from procedures, whereas under our analogies these factors are not usually part of the legal theory but are only relevant to it.

The engineering approach. This section comments on my impression of the approach taken by Prakken and Sartor to the task of describing legal argument, which we will call 'the engineering approach'. The purpose of describing their approach is to contrast it with the approach taken in this thesis.

The engineering approach to the task of describing law is to look at the logical and argumentation tools (such as dialogue games and argumentation frameworks) that are available and then to ask how they can be used or developed to form a description. This is my impression of what Prakken and Sartor have done. In contrast, the approach taken in this thesis might be called the conceptual approach, it is to develop an overall framework for the concept to be described before choosing the logical tools and materials with which to describe it. The general proposition of this thesis is that an adequate overall description of law is needed before it can modelled using logical and argumentation tools.

The shortcomings in the premature use of the engineering approach can be seen in at least two parts of P+S, the use of rule broadening and the use of dialectical asymmetry.

The problem of how to reason when there is no directly applicable rule is solved in P+S by allowing rules to be 'broadened'. A rule is broadened by having one or more of its antecedents removed (presumably a rule with only a single sentence as an antecedent cannot be broadened). The idea is that the antecedent of a rule can be removed if the case in which the rule is to be applied does not contain the sentence that is to be removed. This looks conceptually unacceptable. Even on Prakken and Sartor's simple conception of precedents as sets of rules. If those rules are statements of law, then there is no reason why they should be changed. If those rules are a representation of directed factors (that is legally relevant facts which favour either the claimant or the defendant), then they are simply a representational convenience.

A factor is only relevant to an outcome, it does not entail it in the same way as the antecedent of a rule entails its consequent.

Prakken and Sartor assert that there is a 'dialectical asymmetry' between the Plaintiff and the Defendant. The general idea of which is that the proponent and opponent of a claim have different roles in the resolution of that claim. The proponent must show that the claim is tenable while the opponent only has to prevent the proponent from doing so. This is implemented in P+S through a procedure which requires the proponent's arguments to be strictly defeating whilst the opponent's arguments need be only defeating. Prakken and Sartor assert a connection between dialectical asymmetry and the doctrine of burden of proof in legal systems. My impression is that dialectical asymmetry is developed from the status of arguments in argumentation frameworks. Its connection to the doctrine of burden of proof appears to be tenuous, particularly as in the modern English law, at least, the doctrine of burden of proof applies to matters of fact and not to matters of law. Under our description, once there is an issue, there is no asymmetry between the disputants, they both have legal positions they are obliged to maintain. One of the disputants may then win the dispute by being able to maintain its legal position when the other cannot, but this does not imply that they have different roles.

In respect of dialectical asymmetry, it is illuminating to make a distinction between the ideas of proof and of trial. Under this description, a proof is an argument grounded in an interpretation. When a party is put to proof, it is required to demonstrate how it arrives at the conclusion it asserts from the interpretation in its claim. The burden of proof is a limit on how convincing the party's demonstration must be. By contrast, a trial is a decision procedure by which a claim is tested or tried.

Following this distinction, whilst we can accept that a failure to meet the burden of proof will lead to the failure of a claim, the burden of proof is not in itself a method of trial.

4.5 Value Based Systems

This section will summarise three other pieces of related work, Bench-Capon and Sartor's work on theory based reasoning [24], Chorley and Bench-Capon's work on reasoning with theories [6] and Atkinson, Bench-Capon and McBurney's work on a particular type of practical reasoning [3]. Their subject matter shares a common grounding in the use of values in legal reasoning. Values are taken to be, broadly speaking, desirable states of affairs, such as peace and prosperity. Their view is that the law has as part of its purpose bringing about such desirable consequences.

This work is of relevance to this description particularly because, under the system analysis, interpretation may be grounded on values. To take a rather simplistic example, the 'neighbour concept' of negligence enunciated by Lord Atkin in *Donoghue* [8] may be said to be grounded on the value of Christian fellowship in that Lord Atkin said [page 580]: "*The rule that you are to love your neighbour becomes in law, you must not injure your neighbour*". It is particularly revealing that he makes this statement after having effectively acknowledged that he cannot find a single statement of general application in the precedents (this section, beginning "*It is remarkable how difficult it is to find in the English authorities statements of general application defining the relation between parties that give rise to the duty...*", is quoted more fully in chapter 5). The explanation of this under the system analysis is that he has failed to find a primary interpretation based on precedent and therefore, takes the non-common law step of asserting a primary interpretation based on values.

Bench-Capon and Sartor's model. Bench-Capon and Sartor's model ('BC&S') is a formalism based on a description of reasoning with cases as a process of theory construction, application and comparison.

The general idea of BC&S is that cases are represented as sets of factors and, where the case is a precedent, an outcome. An outcome is either for the plaintiff (a 'p outcome') or for the defendant (a 'd outcome'). It is assumed (as in CATO) that factors have a tendency towards one of the two outcomes.

A factor and the outcome it promotes is constructed into a defeasible rule in the form 'if factor X, then Y outcome'. Rules with p outcomes conflict with rules with d outcomes. However, conflicts between conflicting rules may be resolved in two ways: either, if there is a precedent containing two conflicting rules then the outcome in that precedent is taken as stating a priority between the two rules, that is, the rule that matches the actual outcome of the case is given priority over the conflicting rule, or there is a preference between the values which the rules are assumed to promote.

The second method of resolving conflicts between rules requires some background explanation. BC&S assumes that rules are grounded on social values in that following a rule promotes a social value. Examples of social values given in BC&S are discouraging needless litigation, promoting the enjoyment of property and safeguarding socially desirable economic activity (these three values are designed for the purpose of BC&S's test domain). There are also assumed to be preferences between social values and a link between each rule and a social value. Against that background, priority between rules can be established by reference to a priority between their underlying social values.

Using these building blocks, BC&S constructs theories consisting of, broadly speaking, cases, factors, outcomes and values by using a number of theory constructors. Theory constructors are moves by which, for example, a case or a factor is added to a theory or rules are formed and preferences are established from precedents and values. BC&S also discusses the relation between these constructors and argument moves in CATO and HYPO.

A theory, once constructed, may then be used to explain the outcome of cases, including, most importantly, the outcome of the new case in that the theory will contain a rule taken from a precedent and grounded on a value that justifies the decision.

However, for any particular new case it may be possible to construct two or more theories that may support either the p outcome or the d outcome. Therefore, there is a need to choose between competing outcomes. BC&S orders theories by reference to their relative coherence. Coherence is measured by a number of factors including

explanatory power (broadly speaking, the number of precedents explained by the theory), consistency (broadly speaking, being free from internal contradiction), simplicity and amount of recourse as possible to arbitrary preferences. This part of BC&S is not fully developed.

Under the system analysis, the link between a rule and a value is a non-common law type of interpretation. In BC&S this link is used as a method of conflict resolution between conflicting rules, the suggestion being that the link is established after the conflict between the rules has arisen, whereas under the system analysis, the primary interpretation of rules is established when the rules are promulgated by the legislature. They may then be reinterpreted by the common law judicial process by which the rules would be interpreted by reference to precedents in which they had previously been applied.

BC&S and our description both recognise that the link between a rule and a value, whether it be before the event of conflict (as in this description) or after the event of conflict (as in BC&S) will not always resolve the conflict as there may be a conflict between the underlying values. In this description, this conflict would be dealt with as would any other issue that could not be resolved or rationalised away, it would be subject to the decision mechanism. In contrast, BC&S uses the criterion of coherence to order conflicting theories. Whilst this part of BC&S is not fully developed, it does not look particularly promising as a description of the common law, because it only seems to pass the problem of resolving conflicts into conflicts between theories of equal coherence. Secondly, because that ratio of a decision is constructed after the decision has been made and is a record of it.

Agatha. Chorley and Bench-Capon's 'Agatha' ('ArGument Agent for THeory Automation') [6] is, broadly speaking an implementation of BC&S. It uses a CBR moves in a dialogue between parties. A by-product of that dialogue is a theory, consisting of a mixture of cases, factors, rules, preferences, values and value preferences which explains the decision in the new case.

In terms of the system analysis, the theory constructed by Agatha can plausibly be seen as the *ratio* of a case. [16] notes that increasing the number of precedents

available to the system quickly makes the size of the theory space generated by the system unworkably large. The paper finishes with a discussion as to control the size of the theory space. One suggestion that is considered and rejected is to develop only one instance of identical theories. A second is to use heuristics to select the ‘best’ move to apply and/or precedent to cite. A third alternative which has been developed in further work by the authors (ICAIL 2005, ICAIL workshop), is to use heuristic search based on an evaluation of the theories using the criteria proposed in BC&S, explanatory power, simplicity, freedom from arbitrary preferences and the ability to generalise. Under the system analysis, competing interpretations are set against each other in the issue dialogue and are either resolved together or decided by the decision mechanism, the ratio (that is, the equivalent to Agatha’s theory) is then produced as a record of the reason for the decision.

Arguing with cases as practical reasoning. Atkinson, Bench-Capon and Mc Burney’s paper, [3], sets out to simulate the reasoning in the majority and minority opinions in the decision of a well known American precedent (Pierson v Post, 3 Cai R 175 2 Am Dec 264 (Supreme Court of New York 1805)) using an approach based on a type of practical reasoning called *argument from sufficiency*.

The argument schema called *an argument from sufficiency* is used. The schema is:

‘In the current circumstances R
Action A should be performed
To bring about new circumstances S
Which will realise goal G
And promote value V.’

An argument instantiated into this schema can be attacked by a series of what are called ‘critical questions’, such as ‘Are the believed circumstances true?’ and ‘Does the goal realise the value intended?’. Each of the critical questions is itself grounded in an instantiation of the argument from sufficiency schema.

The argument schema and the critical questions are then instantiated through a multi-agent system called *a belief, desire, intention model* (‘BDI model’). The general idea

of the BDI model is that each agent is a set of beliefs about the world, about actions and about its desires and values. The variables of the argument schema can be filled in from these beliefs to instantiate arguments and to construct attacks, in the form of critical questions, on arguments instantiated by other agents.

These arguments and the attack relations between them are then represented as a type of argumentation framework called a value argumentation framework which reveals the status of those arguments (that is, whether or not they are acceptable) to different audiences (that is, agents with different values etc.,).

Since the agents have beliefs about different things (facts, actions, desires and values), the argument action framework can be split into three different levels, being:

- the level of facts about the world at which desires are derived;
- the level at which legal systems connect with the world to achieve those desires; and
- the level of pure legal concepts.

The conclusions from the arguments at the first level are used as the premises for the arguments at the second level and the conclusions of the second level are used in the same way in the third level.

In terms of the system analysis, this work takes a fundamentally different approach from that taken in this thesis. The starting point for the approach is *"to see deciding a case as an action to be justified, rather than the recognition of a property of a case that enables it to be classified."* Whereas, the starting point is that this thesis is Levi's assumption that law is a moving classification system.

However, despite that fundamental difference, there are more superficial similarities. For example, the argument schema and its critical questions could be represented as a type of dialogue (although it would be more intuitively obvious to represent it as a dialectic), the primary interpretation appears to be value based and the levels of generality in the three levels of the argumentation frameworks also has a familiar look to it.

4.6 Our Earlier Work –Analogy

4.6.1 Introduction

This section describes our earlier work on legal analogy. This earlier work fits into this description in that our analogy mechanism can be seen as an implementation of the transformation rule of this description. It was developed with Levi's description of legal reasoning in mind, to show how case law could develop through a series of decisions and how decisions could be grounded in "*the common ideas of society*" (Levi's phrase).

An example of the judicial use of analogy comes from the case of *Cann v Willson* [2], which concerned the application of a duty arising out of a carelessly prepared valuation report. Chitty J stated: "*In this case the document called a valuation was sent by the Defendants direct to the agents of the Plaintiff.... I think it is like the case of the supply of an article – the supply of the hairwash in the case of George v Skivington. There the hairwash was deleterious – not deleterious for all purposes, but deleterious for the purpose for which it was intended to be used, that is to say, as a hairwash. In this case the document supplied appears to stand on a similar footing and not to be distinguished from that case...*". This is a good example of a legal analogy and of the distinction between a legal analogy and an arbitrary analogy insofar as we would not, outside a legal context, see an arbitrary analogy between a valuation report on a house and a bottle of shampoo.

The transformation rule is, broadly speaking, 'if the facts of the new case are similar to the facts of a precedent case, then apply the rule from the precedent case to the facts of the new case'. Our analogy mechanism works by finding a similarity between a target (which would be the new case in the transformation rule) and a source (which would be the precedent case) and attributing the same values to the source case (which would be the outcome of the precedent case) to the target (ie, the new case).

The next part of this section will present the analogy mechanism as it is presented in [12]. Section 4.6.3 contains an example quoted directly from that earlier work.

4.6.2 Our Analogy Mechanism

We assume that we are given some sort of structured representation of the domain which is the subject of the mechanism and some cases, we then apply our analogy mechanism through three tools.

The structured representation of the domain was taken to stand for Levi's 'common ideas of society'. In the common law, this domain would be the domain of social relations. In our earlier work we represented this by a very simple hierarchy in which the nodes represented classes of objects (types of worker, in the specific hypothetical example that we used) that took prototypical attributes (for example the work type 'school teacher' was given the attribute 'works-in(education)') which were passed by inheritance from parent-class to child-class in the hierarchy, unless they were specifically cancelled for some particular sub-class. Whilst this hierarchy is entirely artificial it is not dissimilar to large scale common sense ontologies such as Wordnet [18]. In general terms the hierarchy is used to make some connection between classes (ie, an analogy) grounded on some common parent class or some common attribute.

The cases were taken to be collections of facts from the common sense hierarchy. (In our example the cases were taken to be the fourteen leaf nodes in the hierarchy and each consisted of one 'fact' being the specific work type of that class.

The three tools were for finding a general analogy, for finding a specific analogy and for converting an analogy into a rule.

The idea behind a general analogy is that if two nodes share a common ancestor-node then there can be said to be an analogy between them. The closeness of the analogy will depend on the relative remoteness of the ancestor-class. There will be many general analogies between nodes in the hierarchy, many of them meaningless. We want one that is useful in enabling us to take a value from the source (which

must be a precedent) and attribute it to the target (ie, the new case). To find a useful analogy we limit our search to a set containing only the new case and the precedents and then analyse that set using concepts of coverage and precision. Coverage is the proportion of the set of all precedents that are captured by the ground of the proposed analogy and precision is the proportion of the set of all children-precedents of the ground class that have been decided in the direction desired (ie, either in favour of the claimant or defendant, depending on whose interests the analogy is being constructed). We then applied these concepts iteratively to generate a general rule with exceptions.

The tool for specific analogy simply involves finding the nearest ancestor of the target case and a precedent case with the desired outcome.

The third tool is for constructing a rule out of the analogy. The idea is again simple. In respect of general analogies we take the name of the general class on which the analogy is grounded as the antecedent of the rule and the outcome of the desired outcome to be the consequent. In the case of specific analogies we take the attribute or attributes shared by the new case and the precedent to be the antecedent of the rule and the outcome in the outcome of the precedent case.

We show in [12] that this mechanism can be used to generate a reasonably realistic model of the process of legal reasoning.

4.6.2 An Example

The following example is an extended quote from one of our earlier papers [12].

“The example is based on the following simplification of reality. Each case in the example concerns the same single question and contains a single fact. The legal question in the example arises out of a fictional rule of common law which states that whether or not a person owes a duty of care to others depends on the job that person does. In some cases the duty of care may be owed by the employer of the person giving the advice rather than the individual; in others the nature of the advice may be such as to give rise to no duty of care at all. For example, under the fictional rule, a

raiding tipster does not owe a duty of care but an investment adviser does. All cases are considered to be of equal authority (ie there are no priority rules between them).

The example will be based on 14 cases, in each of which the defendant has a different occupation. Table 1 lists the cases with their outcomes. These outcomes were assigned randomly, to reflect the uncertain nature of legal decisions. We thought that this would offer a fairer test than assigning them according to some preconception of what the law would turn out to be. The question need not be stated as it is the same in every case, namely whether a duty of care was owed.

Table 1: Cases showing Occupations and Outcomes

Case No.	Fact	Outcome
C1	Accountant	P
C2	Clerk	D
C3	Solicitor	P
C4	General Practitioner	D
C5	Nurse	D
C6	Lecturer	P
C7	School Caretaker	D
C8	Bank Security Guard	D
C9	School Teacher	P
C10	Builder	P
C11	Broker	P
C12	Homeopath	D
C13	Consultant	P
C14	Barrister	D

These cases need to be seen as the leaves of an abstraction hierarchy. The one we use is shown in Figure 2. Both the set of cases and the abstraction hierarchy are, of

course, fictional. We believe that they are, however, sufficiently representative of reality to be of use. Throughout we are interested in modelling a reasoning process, not in providing a legal commentary, and the same process can be applied in a fictitious example as a real one. We have in fact carried out an analysis of actual leading cases relating to duty of care, and so have some grounds for confidence that we are no too much at odds with reality.

We have divided workers into blue collar and white collar workers, according to whether their work is largely manual or not, and also by the field in which they work. We have also distinguished professionals, workers who are valued for their knowledge and expertise, from other workers, whose value lies more in practical skills and their ability to follow more routine procedures.

For each term in the hierarchy we now supply some prototypical attributes. These are here intended to be simply illustrative, and to provide a simple example: they make no pretensions to accuracy.

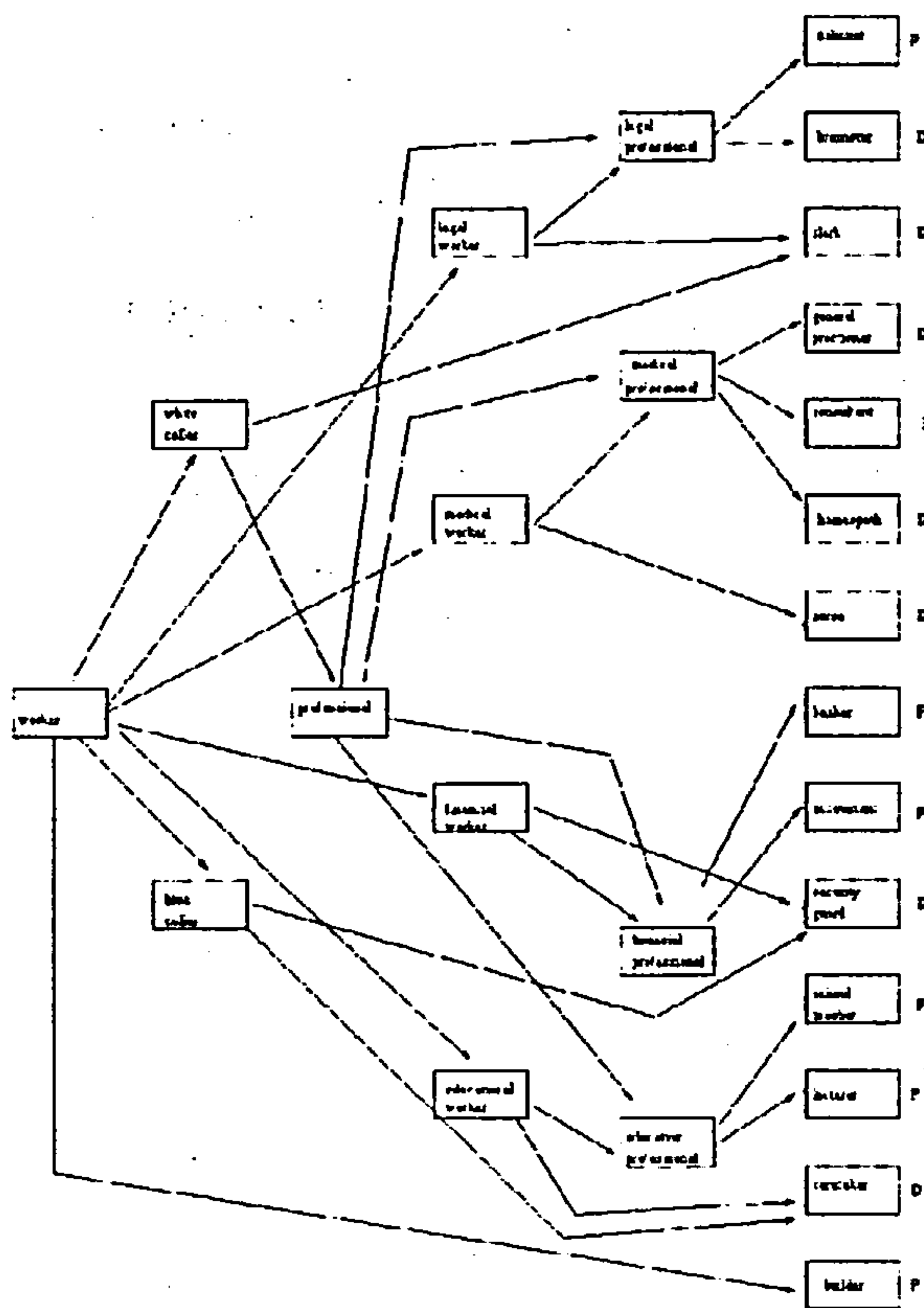


Figure 2: Initial abstraction hierarchy for the cases

Worker is just there to tie the hierarchy together: we will not supply prototypical attributes here.

White collar and *Blue collar* workers are distinguished by the value of an attribute *works-by*: *hand* for blue collar and *brain* for white collar.

Professionals are valued for their expertise: typically therefore they have some professional qualification, and often their activities are regulated by a professional association, often the body which issues professional qualifications, (such as the British Medical Association for doctors in the UK). Prototypically also they are employed directly by their client. We give professionals two prototypical attributes: *professional-qualification*, intended to be given the value of an appropriate qualification, and *employed-by* with the value *client*.

The categories of educational, financial, legal and medical workers are distinguished by the field in which they work. Thus their prototypes will have an attribute *works-in* with values *education*, *finance*, *law*, and *medicine* respectively. Some workers will also be prototypically employed by a particular kind of institution; educators they will have for their *employed-by* attribute, instances of educational institutions, and medical workers the national health service.

When we come down to educational and medical professionals we have a case of multiple inheritance which may involve a clash in the values of *employed-by* inherited from the two parents. One of these must be cancelled: for both educational and medical professionals we cancel the *employed-by(client)* inherited from professional. Prototypically, education professionals also have a subject in which they specialise. We include an attribute *specialist-knowledge* to record this.

We now come to the leaf nodes. Barrister cancels *employed-by(client)* and adds *employed-by(solicitor)* as prototypical; consultants and homeopaths cancel *employed-by(national health service)* and add *employed-by(client)*. Consultants have a specialism, and so an additional prototypical attribute *specialist-knowledge* is used to indicate this, while homeopaths cancel the attribute of professional qualification.

Lecturers and teachers specialise the employing educational institution to universities and schools respectively. Caretakers and security guards have an attribute *job-description*. Nurses and builders have an appropriate vocational qualification, and builders are also prototypically employed directly by their clients. The situation, for the leaf nodes is summarised in table 2.

In the next section we will describe our current prototype implementation which we have used to explore the above example.

Implementation

We have produced a prototype implementation to support and illustrate the above ideas. This comprises a set of tools, designed to produce the information needed to construct the arguments given above. Currently the selection and rejection of the possible lines indicated is done by the user: principles to automate this process will be the subject of future work. The operation will be illustrated with a detailed walk through of the example in the next section.

Throughout we represent the hierarchy as a set of predicates $isa(A,B)$, to be read as "A is a kind of B". Each term in the hierarchy is also associated with a predicate $attributes([Proto],[Canc])$, where Proto is a list of the prototypical attributes associated with that term, and Canc is a list of attributes which would otherwise be inherited but are cancelled by the term.

Finding analogies

The first tool finds the viable analogies, using the notion of the general ground. Given a case, for each superclass of the term, we calculate the precision and coverage for plaintiff and defendant analogies, and return for consideration those which meet the threshold of .66 for precision. We then choose, for each side, the analogy which satisfies the precision threshold with the largest coverage. We return this, together with any analogies with greater precision.

The second tool finds the specific analogy each side. The method is to consider the parent of the case: if this has a descendant decided the right way, return that descendant: otherwise consider grandparents, and so on, until a case is found. Ties are broken using attributes: the paths from the ancestor to the case and the potential analogy are followed, collecting the prototypical attributes from each node, and where an attribute is cancelled this is moved from this list into a list of cancelled attributes. The lists so collected are then compared.

Table 2: Attributes possessed by leaf nodes. Nodes marked with "*" are introduced by that class rather than inherited

Class	Attribute	Cancelled Attributes
Accountant	Prof Qual Works in (finance) Employed by (client) Works by (brain)	
Solicitor	Prof Qual Works in (law) Employed by (client) Works by (brain)	
Barrister	Prof Qual Employed by (solicitor) Works in (law) Works by (brain)	Employed by (client) *
Clerk	Works in (law) Works by (brain)	
GP	Prof Qual Works in (medicine) Works by (brain) Employed by (NHS)	Employed by (client)
Consultant	Prof Qual Works in (medicine) Works by (brain)	Employed by (NHS)

Class	Attribute	Cancelled Attributes
	Special know* Employed by (client)*	
Homeopath	Works by (brain) Works in (medicine) Employed by (client)*	Prof Qual* Employed by (NHS)*
Nurse	Employed by (NHS) Works in (medicine) Voc Qual*	
Broker	Prof Qual Works in (finance) Employed by (client) Works by (brain)	
Bank Security Guard	Employed by (bank) Job description* Works in (finance) Works by (hand)	
Lecturer	Prof Qual Works in (education) Employed by (university)* Works by (brain) Special know	Employed by (client)
School Teacher	Prof Qual Works in (education) Employed by (school)* Works by (brain) Special know	
Caretaker	Employed by (school)* Job description * Works in (education) Works by (hand)	
Builder	Employed by (client) * Voc Qual*	

These two tools form the basis of an argument; we now have both an abstraction of the case and a specific case supporting each side of the dispute.

Creating Arguments

The third tool attempts to summarise the proposed reasoning as arguments. Two techniques are used, one for the general ground, and one for the specific ground.

For the general ground the argument is simply of the form "if ground then plaintiff/defendant", for each analogy. The opponent can also advance arguments to attempt to show that the particular case is an exception. Where an attribute has been introduced or cancelled below this ground, this is used (unless it is subsequently cancelled or re-introduced): otherwise the class name is used. If there is more than one such attribute, separate arguments are generated for each. These "objecting" arguments are thus of the form "if ground and not exception then plaintiff/defendant".

For the specific ground the argument is of the form "If ground and *attributes in common* then plaintiff/defendant", where *attributes in common* are shared prototypical attributes introduced in, or below the common ancestor, and negations of prototypical attributes that both have cancelled. If there are no attributes in common, no argument is advanced: the case is considered of no help. Again, objecting arguments can be found: where there are differences between the two cases, these give an argument for the other side of the form "if differences then plaintiff/defendant"

The general ground works with class names, whereas the specific ground makes use of individual attributes. We think there are advantages in this: a class name carries with it connotations, and assumed attributes which may not be explicit in the ontology, but which none the less guide the way its members are thought about. We need, however, also the specific attributes, since we may expect them to capture some of the more important aspects of the cases.

When the case is decided these rules are annotated with the case and the outcome and stored as a predicate

$\text{arg}(\text{Id}, [\text{A}], \text{C}, \text{Prec})$

where A is the antecedent, C the conclusion, and Prec is the precedent used in the case of a rule generated from a specific ground, and gen otherwise. The id as given in this paper is a number in the case of a positive argument, and in the case of an "objecting argument", the number of the argument objected to, an "o" and a number of the objection. (The implementation gives sequential numbers: but we have changed it here in the hope that this will be helpful to the reader.) When we have the decision we also write a predicate which associates the argument id with the case and its outcome. The outcome will be one of "upheld" or "rejected". Note that by "upheld" we mean no more than that the decision is consistent with the argument, and by "rejected" we mean that the argument was defeated by at least one stronger argument. Thus an upheld argument can be rejected in a subsequent case, and a rejected argument accepted, without inconsistency.

These predicates are used by the fourth tool. The fourth tool examines all rules generated by previous cases, and, and for rules in the present case, presents to the user cases in which they were used, and the outcome. Objecting arguments are retrieved only where the initial argument is retrieved. The same rule here is determined only by antecedent and consequent; thus a rule previously used to support the other side may appear.

The operation of the tools will become clearer as we consider the example in the next section.

The Example in Action

In this section we will go through the example proposed, indicating what our program will produce, and what an intelligent user would do with this information. The narrative will broadly follow that of our earlier work; where there are significant

differences between the arguments given in our earlier work, we will draw attention to them.

When the first case, in our example that of the accountant, is presented, our tools are silent, since there are no precedents to work on. The second case, C2, the clerk, however, allows us to go to work. For the plaintiff there is a single analogy with white-collar worker. There can be no defendant analogies, because there has not yet been a defendant case. Accountant is the specific analogy for the plaintiff, via *white-collar*, and no defendant analogies are possible. C2 therefore, gives the following arguments:

arg(1,[white-collar],p, gen)

arg(1o1,[white-collar,works-in(law)],d, gen)

arg(2,[white-collar],p, C1)

arg(2o1,[not prof-qual,not employed-by(client), works-in(law), not works-in(finance)],d, C1)

Arg1 was generated by the general ground, arg1o1 since clerk may be treated as an exception to this ground because his area of work is added in *legal-worker*. The plaintiff has the specific case C1 which shares only *works-by(brain)*, but there are other attributes not shared with C1 which are put forward in arg2o1. Since C2 was found for the defendant, neither arg1 not arg2 were accepted. We can therefore see *works-in(law)*, and one or more of the exceptions of arg2o1 as able to defeat *works-by(brain)*, and the analogy with white-collar worker.

We are next presented with C3, a solicitor. *White-collar* is no longer an analogy since professional has better precision. Indeed, that of white collar is now only 0.5. Professional is, however, an excellent analogy with coverage and precision 1. A solicitor, however, differs from C1 in that he works in law. The defendant has the general analogy of legal-worker. There is a specific analogy for the plaintiff with C1, through *professional*, with the common attributes *professional-qualification* and *employed-by(client)*, and a specific analogy with C2 for the defendant, through *legal-worker*, with common attribute, *works-in(law)*. We therefore get the following arguments.

arg(3,[professional],p,gen)
arg(3o1,[professional, works-in(law)],d,gen)
arg(4,[legal-worker],d, gen)
arg(4o1,[legal-worker,prof-qual],p, gen)
arg(5,[professional],p, C1)
arg(5o1,[not works-in(finance), works-in(law)],d,C1)
arg(6,[legal-worker],d, C2)
arg(6o1,[prof-qual, employed-by(client)],p,C2)

None of these arguments were used in the previous case. We suggest that the plaintiff would argue that the solicitor is a prototypical professional with a professional qualification and employed by client, as was the accountant. The defendant would rely on the solicitor being a prototypical legal worker, and use the area of work to assimilate the case to C2 rather than C1. In our example the plaintiff wins.

The fourth case is that of a general practitioner. *Professional* is again an analogy for the plaintiff, with coverage 1 and precision 1. The defendant has no general analogy. The plaintiff's specific analogy is with either C1 or C3; we choose C1 as the older case. The defendant's specific analogy is with C2. The case generates the following arguments:

arg(3,[professional],p,gen)
arg(3o2,[professional,works-in(medicine),d,gen)
arg(3o3,[professional,employed-by(nhs),d,gen)
arg(3o4,[professional,not employed-by(client),d,gen)
arg(7,[professional],p,C1)
arg(7o1,[employed-by(nhs), not employed-by(client), works-in(medicine), not works-in(finance)],d,C1)
arg(8,[white-collar], d,C2)
arg(8o1,[prof-qual, employed-by(nhs), works-in(medicine),not works-in(law)],p,C2)

From the previous cases we have arg3 (which was successful in C3). The plaintiff will rely on arg3, but this time the specific analogy of arg7 is not nearly so close as

arg5, containing fewer similarities and more objections in arg7o1. The defendant's best positive argument is the specific analogy with C2. Note that this is the argument proposed as arg2 by the plaintiff in C2, but since it was rejected there it can now be put forward for the opposing position. There are, however, a large number of differences between C4 and C2, and so the defendant's strongest position is to use arguments 3o2, 3o3 and 3o4 to discredit the analogy in C5. Since the defendant wins C4, we may assume that arg3 is beaten by one of these.

C5 deals with a nurse. The plaintiff this time has no analogy, whereas the defendant has a coverage 0.5 and precision 1 analogy with medical worker. The specific defendant analogy is with general practitioner, whereas the plaintiff has nothing better than C1, which cannot form the basis of an argument because there are no common attributes. The resulting arguments are:

arg(9,[medical-worker],d,gen)

arg(9o1,[works-in(medicine),voc-qual],p,gen)

arg(10,[medical-worker],d,C4)

arg(10o1,[voc-qual,not prof-qual,not works-by(brain)],p,C4)

The plaintiff's case looks weak here: were it to be accepted it would highlight the importance of a professional rather than a vocational qualification. In fact the defendant's case is accepted. so a vocational qualification is not seen as an important exception to medical-worker.

C6 deals with a university lecturer. The plaintiff can still use the analogy with professional, (coverage 1 and precision 0.67), and the defendant again has no general analogy. The plaintiff will again use C1 as the specific analogy, but C4, using professional, is a better specific analogy for the defendant than C2. The arguments are:

arg(3,[professional],p,gen)

arg(3o4,[professional,not employed-by(client)],d,gen)

arg(3o5,[professional, works-in(education)],d,gen)

arg(3o6,[professional, employed-by(university)],d,gen)

arg(307,[professional,special-know],d,gen)

arg(7,[professional],p,C1)

arg(702,[special-know,not employed-by(client),employed-by(university),works-in(education),not works-in(finance)],d,C1)

arg(11,[professional],d,C4)

arg(1101,[special-know,works-in(education),not works-in(medicine), not employed-by(nhs),employed-by(university),],p,C4)

Again we get arg3, but this time we have three different objections, and neither of those which succeeded in C4. The similarities with C1 are exactly those used in C4, and again there are many differences. Note that arg11 relies on these *same* similarities (acceptable because they were rejected in C4, and so it is as yet undecided which side they favour) to urge the defendant's case. Again there are many differences, as indicated by 701 for C1 and 1101 for C4.

The plaintiff wins, and so we may think that none of the objections 304, 305, 306 and 307 are not good enough to find against professional. This suggests that arg304 was not the decisive objection to arg3 in C4. We may also see one of the objections in 1101 as enough to overturn the analogy with C4.

We now reach a rather different case, C7, the school caretaker. The plaintiff has a general analogy of education worker, with coverage 0.33 and precision 1, and C5 provides the specific analogy, through *education-worker*. The defendant has no general analogy, nor any prior case with any attribute in common. The defendant must therefore rely entirely on objections to the plaintiff's arguments.

arg(12,[education-worker],p,gen)

arg1201,[education-worker, employed-by(school)],d,gen)

arg(1202, [education-worker, job-description],d,gen)

arg(1203. [education-worker, works-by(hand)],d,gen)

arg(13,[education-worker], p,C6)

arg(1301,[employed-by(school),not employed-by(university), job-description, not prof-qual, not special-know, works-by(hand), not works-by(brain)],d,C6)

In fact the negative arguments prevail; education worker is rejected as the grounds for a plaintiff analogy, and one of the many differences given in 13o1 can be seen as significant.

C8 involves a security guard working for a bank. The plaintiff has an analogy grounded in financial worker, with coverage 0.33 and precision 1. and the defendant one grounded on blue-collar worker, with coverage 0.25 and precision 1. The plaintiff's specific analogy is with C1, through financial worker, and the defendant's with C7, through blue-collar worker. We therefore have a number of arguments here:

arg(14,[financial-worker],p,gen]

arg(14o1[financial-worker, works-by(hand),job-description],employed-by(bank)],d,gen)

arg(15,[blue-collar],d,gen)

arg(15o1,[blue, collar, works-in(finance)],p,gen)

arg(15o2,[blue-collar,employed-by(bank)],p,gen)

arg(15o3,[blue-collar,job-description],p,gen)

arg(16,[financial-worker], p,C1]

arg(16o1,[employed-by(bank),not employed-by(client), works-by(hand),not works-by(brain),job description, not prof-qual],d,C1)

arg(17,[blue-collar, job-description,d,C7)

arg(18,[works-in(finance), not works-in education),employed-by(bank),not employed-by(school)],p,C7)

Here again the defendant wins. In the last two cases, the arguments for the defendant generated deviated from those that we suggested would be best in our earlier work. There we suggested that the simple argument "not a professional" would suffice. That such an argument is not generated is because the ontology does not have such a class. If such a class did exist, it would ground a defendant analogy with coverage 0.75 and precision 1, and so would have been reported. The lack of such a class reflects a presumed uselessness of the distinction in common life: however, that it would give rise to the natural legal argument suggests that a rather different legal conceptualisation is forming as the cases develop. We will return to this point later.

C9 is the school teacher. The plaintiff has analogies with professional (coverage 1 and precision 0.75), and educational professional (coverage 0.33 and precision 1). The defendant has no analogies (educational worker since C7 having a precision of 0.5 for both sides). The specific analogies are with C6 for the plaintiff and C7 for the defendant. The arguments are therefore:

arg(3,[professional],p,gen)

arg(3o4,[professional,not employed-by(client)],d,gen)

arg(3o5,[professional, works-in(education)],d,gen)

arg(3o8,[professional, employed-by(school)],d,gen)

arg(3o7,[professional,special-know],d,gen)

arg(19,[education-prof],p,gen)

arg(19o1,[education-prof,employed-by(school)],d,gen)

arg(20,[edu-prof],p,C6)

arg(20o1,[employed-by(school),not employed-by(university)],d,C6)

arg(21,[education-worker,employed-by(school)],d,C7)

arg(21o1,[prof-qual, not job-description, works-by(brain, not works by(hand),special-know)],p,C7)

In C6, none of 3o4, 3o5 and 3o7 prevailed over 3, and so the defendant must urge 3o8 as the main objection, which is also the basis of the objection to arg19. This is also a key attribute in common with C7, the defendant's specific case. None the less from arguments 20 and 21 it is not unreasonable to see C6 as closer than C7, and we may not be surprised when the plaintiff wins. Had the result gone the other way, *employed-by(school)* would have assumed considerable importance.

Now we get a very different case, C10, the builder. Builder has only worker in common with any prior case, and so there are no analogies with sufficient precision. For the specific analogies, all cases are equally close and so we must look at attributes. The builder has only one attribute in common with a prior defendant case, the vocational qualification shared with C5. He also has *employed-by(client)* in common with the plaintiff cases C1 and C3. We choose C1 as the earlier case.

arg(22,[worker,employed-by(client)],p,C1)

arg(22o1,[voc-qual, not prof-qual, not works-in(finance),not works-by(brain)],d,C1)

arg(23,[worker,voc-qual],d,C5)

arg(23o1,[employed-by(client),not employed-by(nhs),not works-in(medicine),p,C5).

The case is a hard one, because the best established analogy, professional, has two prototypical attributes, and whereas in the past we had not met employed-by(client) without prof-qual, here we have such a case. When this is decided for the plaintiff, it seems to suggest that employed-by(client) is crucial, as suggested by arg22.

C11, the broker, is by contrast straightforward. The plaintiff can use analogies with professional (coverage 0.8 and precision 0.84) and with financial professional (coverage only 0.2, but precision 1). The defendant has no general analogy. The specific analogy for the plaintiff is with C1, and for the defendant with C8. The arguments are:

arg(3,[professional], p,gen)

arg(3o9,[professional, broker],d,gen)

arg(24,[financial-prof],p,gen)

arg(24o1,[financial-prof,broker,d,gen)

arg(25,[financial-prof],p,C1)

arg(26,[financial-worker],d,C8)

arg(26o1,[prof-qual,not job-description, employed-by(client), not employed-by(bank), works-by(brain), not works-by(hand)],p,C8)

This looks rather straightforward. All the defendant can argue is that like C8, C11 works in finance, but this is a similarity with the plaintiff case C1, and was used as a pro-plaintiff argument in C8. The only objections to the general analogy are that there is something special about brokers, not represented in the ontology. In our example the obvious happens, and the plaintiff wins.

In C12 we have an example of the homeopath, who has no professional qualification, but is employed by the client. The analogy with professional works for the plaintiff (coverage and precision 0.84), but the defendant has the analogy with medical

worker, with coverage 0.4 and precision 1. The defendant has a specific analogy with general practitioner. The plaintiff's specific analogy is interesting: our algorithm gives C1, although a case might be made for C10, builder, which also lacks the professional qualification. Again this is partly a consequence of our representation where the semantic connection between vocational qualification and lack of professional qualification cannot be made. The arguments here are:

arg(3,[professional], p,gen)

arg(3o10,[professional,not prof-qual],d,gen)

arg(3o2,[professional,works-in(medicine),d,gen)

arg(27,[medical-worker],d,gen)

arg(27o1,[medical-worker, employed-by(client)],p,gen)

arg(27o2,[medical-worker, not employed-by(nhs)],p,gen)

arg(27o3,[medical-worker, works-by(brain)],p,gen)

arg(28,[professional],p,C1)

arg(28o1,[not prof-qual, works-in(medicine),not works-in(finance), d C1)

arg(29,[medical-prof],d,C4)

arg(29o1,[not pro-qual, employed-by(client),not employed-by(nhs)],p,C4)

Here, although after C10 we might think that 27o1 was a good enough objection to arg27, the case is found for the defendant.

C13 offers another kind of medical worker, a consultant. the plaintiff has no better analogy than professional, with coverage still 0.84, but precision now down to 0.71. The defendant again had medical worker, coverage now up to 0.5, and precision 1. The specific analogy for the defendant is again C4, but the plaintiff can this time use C6 which has more attributes in common than C1, because of to the specialist knowledge of the consultant. This gives the following arguments:

arg(3,[professional], p,gen)

arg(3o2,[professional,works-in(medicine),d,gen)

arg(3o7,[professional,special-know],d,gen)

arg(27,[medical-worker],d,gen)

arg(27o1,[medical-worker, employed-by(client)],p,gen)

arg(27o2,[medical-worker, not employed-by(nhs)],p,gen)
arg(27o4,[medical-prof,special-know],p,gen)
arg(30,[professional, special-know],p,C6)
arg(30o1,[employed-by(client), not employed-by(university),
works-in(medicine) not works-in(education)],d,C6)
arg(31,[medical-prof],d,C4)
arg(31o1,[special-know, employed-by(client), not employed-by(nhs),p,C6]

Since this uses args3 and args27 as did C12, we can make some instructive comparisons, when C13 is decided for the plaintiff. Arg3o6 was rejected in C6 and is rejected here also. But arg27o4, is new to C13, and this seems enough to overturn the previously favoured analogy in arg27, drawing attention to the importance of *specialist-knowledge*.

The last case, C14, concerns a barrister. The general plaintiff analogy is still professional, now with coverage 0.86 and precision 0.75, and also legal professional with precision 1. The defendant has no general analogy. The plaintiffs specific analogy is with the legal professional, C3, whereas the defendant can go to either C2, through legal worker, or to C4 or C12 through professional. On attributes C4 is closest. The arguments now are

arg(3,[professional], p,gen)
arg(3o1,[professional, works-in(law)],d,gen)
arg(3o4,[professional,not employed-by(client)]d,gen)
arg(3o11,[professional, employed-by(solicitor)],d,gen]
arg(32,[legal-prof],p,gen)
arg(32o1,[legal-prof, not employed-by(client)]d,gen)
arg(32o2,[legal-prof, employed-by(solicitor)],d,gen)
arg(33,[legal-prof]),p,C3)
arg(33o1,[employed-by(solicitor), not employed-by(client)],d,C3)
arg(34,[professional,not employed-by(client)],d,C4)
arg(34o1,[works-in(law), not works-in(medicine), employed-by(solicitor),not
employed-by(nhs)],p,C4)

This final case is found for the defendant.” (This is the end of the extended quotation from [12]).

The most important point to note for the purposes of this thesis is that the cases are presented as a sequence and that the governing rule changes over time and precedents are re-interpreted.

This chapter has reviewed related work in AI and law using the ideas developed in this thesis, it then described our earlier work and its place in our description. The next chapter will review some parts of the English common law using the ideas developed in this thesis.

5. The English Common law

Introduction

This chapter will describe parts of the English common law using the concepts and ideas put forward in the previous chapters. The purpose of this chapter is to show how our general description of common law can be linked back to the actual examples (ie, the English common law) on which it was based.

This Chapter is split into four sections. Following this introduction, section 5.2 looks at a part of the substantive common law and section 5.3 at the procedural common law. Finally, section 5.4 comments on the different methods of interpretation between common law, legislation and equity.

5.2 The Substantive English Common Law of Obligations

5.2.1 Introduction

Our example domain, taken at its widest, is the English common law of obligations which concerns both rights (such as contractual rights) and wrongs (such as the torts of negligence and deceit). The hypothesis underlying this thesis is that the law is a moving classification system that applies to itself. Therefore, we should expect to see both first order change in the classification of social relations and second order change in the classification of the law.

Lord Goff recognizes second order change when he states in *Henderson v Merrett* [14], *“All systems of law that recognize a law of contract and a law of tort (or delict) have to solve the possibility of claims arising from breach of duty under the two rubrics of law..., the common law grew up within a procedural framework uninfluenced by roman law. The law was categorized by reference to the forms of action and it was not until the*

abolition of the forms of action by the Common Law Procedure Act 1852 that it become necessary to reclassify the law in substantive terms."

This section sets out a high level and selective summary of the long term development of part of the common law of obligations. It is, very broadly speaking, increasingly specific. Section 5.2.2 contains some comments on general characteristics of the early common law. Section 5.2.4 contains some comments on more specific parts of the law in a middle period and Section 5.2.4 summarises the development of the modern law of negligence. There is a reconstruction of part of a single opinion in a single precedent, Lord Morris' opinion in *Hedley Byrne* in Appendix 1.

Taken together, these sections illustrate the long term second order change. Section 5.2.4 illustrates shorter term first order change.

5.2.2 The Law of Obligations in the Early English Common Law

The early common law was classified by forms of action ('writs'), rather than by legal concepts. Forms of action were the foundation of the judicial process. Therefore, our description will begin with the classification of writs.

Rights and wrongs. Baker states [4, page 80] that "*The classification of writs begins with the distinction between a right and a wrong*". A right was taken to be an entitlement that could be enforced, a wrong (or tort) was a state of affairs that had already accrued and in respect of which the claim would be for compensation or remedy rather than performance.

Contracts create rights. The closest equivalent to the modern concept of private contract (ie, a legally binding agreement), in the early common law was covenant. A writ of covenant was issued to enforce a right in that it commanded the defendant to keep (ie, perform) the covenant that it had made with the plaintiff (as distinct from the modern common law, under which the remedy for breach of contract is almost always

damages to compensate for the breach and only very rarely an order that the defendant perform its obligation under the contract – known as specific performance).

Assumpsit was a wrong. Among the writs used to remedy or compensate wrongs was the action on the case for *assumpsit*. The important point to note for our purposes is only that the writ of *assumpsit* was as fundamentally different from the writ of covenant as it was possible to be – the writ of *assumpsit* was for the remedy of a wrong, the writ of covenant was for the enforcement of a right. However, we will see that the concept of contract is eventually unified under the concept of *assumpsit*,

Contract was unified under *assumpsit*. The development of contract begins, in the early fourteenth century, when, in order to succeed, a claim for covenant required the agreement upon which it was founded to be made under seal. Since, as a matter of practicality, many simple agreements were not entered into under seal, the writ of covenant could not be used to enforce them and the parties that had suffered breach of agreement not under seal searched for alternative forms of action.

One of the forms of action resorted to was an action for a type of trespass which became known as *assumpsit super se*. An action for trespass was a claim that a wrong had been committed (as distinct as distinct from a claim that a right had not been honoured). In other words, “a trespass or wrong (*transgressio*) is a fundamentally different from the right to the performance of a covenant” [4, page 182]. *Assumpsit super se* was first used in the Humber Ferry Case of 1348 [4, page 183]

However, some breaches of covenant caused damage which could be classed as a wrong (Baker [4], gives the example of a surgeon who covenants to cure a patient, but in fact further injures the patient).

Therefore, actions on *assumpsit* came to be used in cases in which there was an agreement which was not under seal (and therefore, covenant was not available) which imposed an obligation on the defendant to take some positive action which the defendant

did not do properly and thereby caused damage to the plaintiff. (Baker refers to the wrongful discharge of a positive obligation as 'misfeasance'). The conceptual shift that had taken place is that some types of contractual rights had been reclassified as wrongs.

However, this conceptual shift left another class of actions, where the defendant had not actually positively committed a wrong, but had simply omitted to do something that it was covenanted to do ('nonfeasance'), unremedied. By further development, most cases of nonfeasance also came to be actionable on *assumpsit*.

Consideration for contract. Once it became settled that most cases of nonfeasance could be accommodated within the *assumpsit* form of action, a new problem arose which was how to decide whether a promise or agreement was sufficiently binding for its breach to be actionable on *assumpsit*. The solution that the courts found was the concept of 'consideration' – which was the reason, if any, why the defendant should be liable on a particular promise. The doctrine of consideration subsequently developed into the corner stone of the law of contract as developed in the modern common law.

Therefore, according to Baker [4, page 189] "*Before 1600 assumpsit could be defined in modern terms as "a mutual agreement between the parties for a thing to be performed by the defendant in consideration for some benefit which must depart from, or of some labour or prejudice which must be sustained by, the plaintiff"* (for which he cites Slade's case, 1589) and the law of contract was unified through the action of *assumpsit*.

This summary does not mention the tort of negligence. There does not appear to have been a form of action in negligence in the early common law, although it did constitute an element of some forms in trespass including some actions on *assumpsit*.

5.2.3 The Period between the Early and Modern Periods

We will assume that the modern period began with the formulation of the unified concept of negligence in Donoghue [8]. The modern period is dealt with in the next section.

This section describes three developments between the early and the modern periods, pre-modern negligence, an exception to the nineteenth century doctrine of contract and some the decisions leading up to Donoghue and Hedley Byrne.

Pre-modern negligence. Baker states [4, page 225]: *Little evidence can be found of a tort called negligence before the nineteenth century and even at the beginning of the twentieth century Sir John Salmon could deny its existence as a separate entity*"

However, as and when it was an element in another form of action, the immediate substantive question to be answered was, in what situations did a duty to take care arise which, if breached would give rise to negligence. Baker describes the answer to this question as follows...*"by the middle of the [eighteenth] century, however, a clear answer had been formulated in [An Institute of the Law Relative to Trials at Nisi Prius(1768)]....The author, apparently on no other authority than his own, suggested for the first time a principle which is now familiar to every law student: "Every man ought to take reasonable care that he does not injure his neighbour.."// The "neighbour" principle was redefined in the classic speech of Lord Atkin two centuries later in Donoghue v Stevenson".*

The point to draw from this is that negligence which is central to the modern common law classification of torts, did not exist as an independent form of action under the early common law.

Levi's example domain. In [14] Levi's example domain follows the development of a line of cases that is usually described as being concerned with an exception to the doctrine of privity of contract. This doctrine holds that only the parties to a contract (from whom consideration had moved) may incur the benefits and burdens created by the contract.

The series of cases reviewed by Levi establish and develop an exception to this doctrine in cases where the subject matter of the contract is dangerous and injures a person who

is not a party to the contract. Levi's list begins with *Dixon v Bell* in 1815 [7] and includes reference to *Donoghue* and (slightly) beyond.

Levi shows how a three stage life cycle of a legal concept can be seen in his chosen domain. The stages are, broadly speaking, creation, consolidation or application and breakdown. We will look at the life cycle in more detail below where it will be applied to the modern concept of negligence.

Decisions leading up to *Donoghue*. Baker describes the development of the tort of negligence for the beginning of this period as follows: "*During the last century or so [he was writing in 1971], however, the law of torts has been undergoing gradual reclassification as a result of the rapid expansion of the new tort of negligence.*"

The following cases are not intended to show the development of negligence (only one of them, *Heaven v Pender* [10] is a direct precursor of *Donoghue*), but are intended to illustrate how the boundaries between the various concepts that go to make up the law of obligations are blurred. We have argued (see Appendix 1) that the interpretations of agents are often fuzzy. These cases suggest the same fuzziness in the system on a larger scale. The only theme of the cases is that they are those that are referred to by Lord Morris in his opinion in *Hedley Byrne* which is analysed in detail in Appendix 1. They include cases from Levi's domain (based on an exception to the doctrine of privity of contract – for example *George v Skivington* [9]), a case on fraud (*Derry v Peek* [6]), and on fiduciary duty (*Nocton v Lord Ashburton* [21]). We will present them in chronological order.

George v Skivington. (1869) [9]. The claimant was the user of some shampoo, brought for her by her husband and which somehow caused her injury. The defendant was the compounder and seller, to the claimant's husband, of the shampoo. The seller knew that the shampoo was for use by the purchaser's wife. It was found that the defendant owed a duty to the claimant. This case is one of Levi's, it is also the precedent for the decision in *Cann v Willson* [2], itself the precedent for the decision in *Hedley Byrne* – see below.

Heaven v Pender (1883) [(1883) 11 QBD 503]. The claimant was a ship painter, the defendant a dock owner who had put up some staging beside a ship that the claimant was painting. The staging collapsed, because it had been carelessly put up, and injured the claimant. It was held that the defendant owed the claimant a duty of care. It was in this case that Brett MR, in a minority judgment, declared a general formulation of negligence similar to that subsequently declared in Donoghue .

Derry v Peek (1887) [(1887) 37 Ch.D 541] Court of Appeal. The claimant was an investor in a company, the defendant was a director of the company. The company's prospectus, issued by the directors, wrongly described the company's powers. The claimant relied on the prospectus in deciding to invest in the company. The claimant sued in the tort of deceit which, to succeed, required fraud to be proved. The Court of Appeal decided that fraud could consist of either dishonesty or a lack of a reasonable belief in the truth of the statement in question. The Court of Appeal's decision was appealed to the House of Lords, see below, but in the meantime Cann v Willson was decided.

Cann v Willson (1888) [(1888) 39 Ch.D 39]. The defendant was a surveyor who prepared a valuation report on a property for its owner, who was intending to raise a mortgage on the property. The claimant was the mortgagee. The defendant knew that the purpose of the report was to induce the mortgagee to make the loan. The claimant relied on the report in deciding to make the loan. The report negligently misstated the value of the property. The claimant foreclosed on the mortgagor and then discovered that the value of the property did not cover the value of its loan. The judge, Chitty J following the definition set out by the Court of Appeal in Derry v Peek, found that there was fraud. He also decided on the strength of a factual analogy with George v Skivington [9, and quoted in chapter 4], that there was a duty of care.

Derry v Peek (1889) [(1889) App.Cas. 337]. House of Lords. The facts were the same as the case in the Court of Appeal, described above. The House of Lords reversed the

Court of Appeal's decision and decided that fraud required dishonesty to be proved. Part of Lord Hershall's opinion is digested in chapter 2.

LeLievre v Gould (1893) [(1893) 1QB 491]. Court of Appeal. The claimant was the mortgagee who agreed to loan money to a third party builder. The builder was using the loan to build two new houses. The loan was secured by a mortgage on the houses. The loan was to be paid in installments at specified stages in the progress towards completing the houses. The defendant was a surveyor and architect who was appointed to certify that progress had been made in the building of the houses. The claimant relied upon the certificates of the defendant in advancing the loan installments to the builder. The certificates were not correct. The Court of Appeal followed the House of Lord's decision in *Derry v Peek* in finding that, in the absence of dishonesty or a contract, there was no other common law obligation owed by the defendant to the claimant.

Nocton v Lord Ashburton. (1914.) [[1914] A.C. 932]. House of Lords. The claimant was the mortgagee of a property development. The defendant was the claimant's solicitor. The claimant entered into the mortgage on the defendant's advice. The defendant had also loaned money to the same property developer secured by a second mortgage against the same property. The defendant advised the claimant to release part of the property from its mortgage. In reliance on this advice the claimant did so, the result was to improve the defendant's security but to leave the claimant with inadequate security for his loan. The mortgagor defaulted on the repayments and the claimant lost his loan. The claimant brought an action in fraud. It was found as a fact that the defendant had an honest belief in his advice to the claimant and, therefore, fraud failed. However, a fiduciary duty was found, in breach of which the defendant was found liable. This is the case that is subsequently relied upon by Lord Morris in *Hedley Byrne* as the basis for his reinterpretation of *Derry v Peek*.

5.2.4 The Modern Law of Negligence

This section summarises some of the cases in the development of the modern law of negligence and of the voluntary assumption of responsibility and of the relationship between them and contract. Again, the cases are presented in chronological order. These precedents reveal a change in the first order classification of the common law.

Donoghue v Stevenson (1932) [[1932] A.C. 562. House of Lords. The defendant was the manufacturer of ginger beer, the claimant was the consumer of a bottle of the defendant's ginger beer that had been brought for her by a friend from a retailer. The ginger beer was contaminated by the decomposing remains of a snail. It poisoned the claimant. The House of Lords found that a duty of care existed and Lord Atkin formulated the modern test for negligence. He prefaces this test by saying (p579):

"It is remarkable how difficult it is to find in the English authorities statements of general application defining the relations between parties that give rise to the duty. The Courts are concerned with the particular relations which come before them in actual litigation, and it is sufficient to say whether the duty exists in those circumstances. The result is that the Courts have been engaged in an elaborate classification of duties as they exist in respect of property, ... and so on. In this way it can be ascertained at any time whether the law recognizes a duty, but only where the case can be referred to some particular species that has been examined and classified. And yet the duty which is common to all the cases where liability is established must logically be based upon some element common to the cases where it is found to exist...//At present I content myself with pointing out that in the English law there must be, and is, some general conception of relations giving rise to a duty of care, of which the particular cases found in the books are but instances."

His assertion that there must be some general conception is contradicted in Caparo [3, see below]. Under our analysis, Lord Atkin is not engaged in precedent based reasoning, but, in second order reasoning, about the various different species of duty.

Compare this with the precedent based approach of Lord Hershall in *Derry v Peek* digested in Chapter 2.

Candler v Crane Christmas [1951] 1 All ER 426. Court of Appeal. The claimant was a person interested in investing in a company. The defendants were accountants who produced a set of accounts for that company. The defendants knew that the accounts were to be shown to the claimant to help persuade him to invest in the company. The accounts were shown to the claimant and in reliance on them he invested in the company. The accounts had been prepared carelessly and did not give a true statement of the financial position of the company which went into liquidation. The claimant lost his investment and sued the defendant for breach of duty. The Court of Appeal, Denning LJ dissenting, held, following *LeLievre v Gould*, that there was no duty on the facts of the case.

Hedley Byrne v Heller (1961) [[1961] 3 All ER 891. House of Lords. See Appendix 1.

The House of Lords decided that a common law duty did exist. However, the duty was in fact negated by a disclaimer given by the defendant when giving the advice – he said that it was given ‘without responsibility’. Part of Lord Morris’ opinion is analysed in Appendix 1.

Midland Bank v Hett Stubbs and Kemp. (1978) [[1978] 3 All ER 571. The claimant was the executor of the estate of a deceased farmer, who, by agreement with his father, had an option to purchase his father’s farm. The defendant was the solicitor who drew up the option agreement between the claimant and his father. The defendant failed to register the agreement as a legal charge over the land (which would have prevented the farm from being sold without the claimant being notified in advance). The claimant’s father subsequently conveyed the farm to his wife and the claimant lost the opportunity to buy the farm. He sued the solicitor for breach of professional duty.

The main issue was whether or not the claim was time barred under the Limitation Act 1939. This issue depended upon whether the claim was made in contract or in tort (the limitation periods are different for each). The decision raised the relationship between the concept of common law duty and the concept of contractual duty, in the form of a solicitor's retainer. Oliver J found himself faced, on one of his interpretations of the authorities, by the dilemma of conflicting authorities of the Court of Appeal, both of which were binding on him. He chose the interpretation under which a claim in tort is not precluded by the existence of a parallel duty in contract, quoted in chapter 1.

Ann's -v- Merton Borough Council (1978) [[1978] A.C. 728. The claimants were lessees of a flat in a block of flats which was suffering from cracking caused by movement of its foundations. The defendant was the local authority that had carelessly approved the inadequate depth of those foundations, during construction. The claimants sued the defendant for breach of duty of care. Lord Wilberforce, giving the principle opinion in the House of Lords, decided that there was a duty of care and, in doing so, reformulated the test, previously laid down in *Donoghue*, for establishing the existence of the duty of care into a two-stage test. The first stage was to ask whether or not there was sufficient proximity between the claimant and the defendant. The second stage was, if the first was answered affirmatively, to consider whether there were any policy considerations which should reduce or limit the scope of the duty to exclude the claimant.

D&F Estates Ltd v the Church Commissioners (1988) [(1988) 41 BLR 1]. The claimants were lessees of a flat. The defendant was the main contractor who had built the flat including defective plasterwork installed by a subcontractor. The claimant sued for the cost of remedying the defective plasterwork. The House of Lords held that the loss sustained by the claimants in renewing the plasterwork was pure economic loss which was not recoverable under the tort of negligence.

Murphy v Brentwood District Council. (1990). [[1990] 2 All ER 908]. The claimant was a purchaser of a house. The defendant was a local authority that had carelessly

approved the plans for the construction of that house, including foundations which were inadequate. The foundations subsequently cracked and caused extensive damage to the rest of the house. The claimant claimed damages to compensate him for the reduction in value of the house. The House of Lords decided that the claimant was not entitled to recover damages and, in doing so, expressly over-ruled the decision in *Anns* (see above). In *Murphy v Brentwood* [20], Lord Keith described the decision in *Anns* [1] as.. “...*a remarkable example of judicial legislation.*”

Caparo v Dickman (1989) [[1990] 2 AC 605]. The claimant was the purchaser of a company. The defendant was a firm of accountants that had audited the accounts of that company prior to its purchase and under the terms of a contract with the previous owners of the company. The claimant sued the defendant for allegedly, negligently certifying that the accounts showed a true and fair view of the company's financial state. The House of Lords decided that the defendant's auditors did not owe a duty to the claimant or to potential investors generally.

In his opinion, Lord Roskill stated, in reference to the rule in *Hedley Byrne*:

... “*Subsequent attempts to define both the duty and its scope have created more problems than the decisions have solved. My noble and learned friends have traced the evolution of the decisions from *Ans v Merton* until and including the most recent decision of your Lordships' house I agree with your Lordships that it has now to be accepted that there is no simply formula or touchstone to which recourse can be had in order to provide in every case a ready answer to the questions whether, given certain facts, the law will or will not impose liability for negligence or, in cases where such liability can be shown to exist, determine the extent of that liability*”.

In his opinion, Lord Oliver comes to consider the nature of the concept of negligence. He first refers to *Donoghue* as a case concerning loss caused by physical damage and then refers to *Hedley Burn* as follows:

“The extension of the concept of negligence since the decision in this House in Hedley Byrne ... to cover cases of pure economic loss not resulting from physical damage has given rise to a considerable and as yet unsolved difficulty of definition, although the cases in which the courts have imposed or withheld liability are capable of an approximate categorisation, one looks in vain for some common denominator by which the existence of the essential relationship can be tested. Indeed, it is difficult to resist a conclusion that what have been treated as three separate requirements are, at least in most cases, in fact merely facets of the same thing, for in some cases the degree of foreseeability is such that it is from that alone that the requisite proximity can be deduced, whilst in others the absence of that essential relationship can most rationally be attributed simply to the court’s view that it would not be fair and reasonable to hold the Defendant responsible. Proximity is, no doubt, a convenient expression so long as it is realised that it is no more than a label which embraces not a definable concept but merely a description of circumstances from which, pragmatically, the courts conclude that a duty of care exists \ \, for my part, I think that it has to be recognised that to search for any single formula which will serve as a general test for liability is to pursue a will-o’-the wisp”.

Henderson v Merrett Syndicates (1994) [[1994] 3 All ER 506]. The claimants were investors in Underwriting Syndicates of the Lloyds insurance market. The defendants were their agents. The claimants suffered massive losses on the insurance market. The House of Lords decided that there was a concurrent duty in contract and tort. The leading opinion, given by Lord Goff, stated that the governing principle was contained in Hedley Byrne which established liability for words as well as actions and for pure economic loss as well as physical damage. Lord Goff’s judgment emphasises the assumption of responsibility as a crucial feature for establishing liability under the test in Hedley Byrne.

This decision establishes a priority rule between the concepts of common law negligence and contractual duty. An extract from the conclusion of Lord Goff’s opinion is quoted in section 2.4.2 as an example of a Law predicate. It is worth noting that the priority

rule established is the opposite of the rule that existed in at least the sixteenth century if not earlier –Baker, [4, page 224], citing *Golding v Goteer* (1665), 1 Keb. 847, refers to “*the rule that claims in contract and tort could not be joined in one action*”.

Modern Negligence in Levi’s Lifecycle. As described above the story of modern negligence fits neatly into the three stages in the life cycle of a legal concept, referred to by Levi [14], as follows:

“*The first stage is the creation of the legal concept which is built up as cases are compared. The period is one in which the court fumbles for a phrase. Several phrases may be tried out; the misuse or misunderstanding of words itself may have an effect. The concept sounds like another, and the jump to a second is made*”. In modern negligence the first stage was the establishment of the rule in *Donoghue*, following the rejection of the same concept in *Heaven v Pender* [10].

“*The second stage is the period in when the concept is more or less fixed, although reasoning by example continues to classify items inside and out of the concept.*” In negligence this includes the development of the concept in *Anns v London Borough of Merton* [1].

“*The third stage is the breakdown of the concept, as reasoning by example has moved far ahead as to make it clear that the suggestive influence of the word is no longer desired*”. The concept of negligence as defined in *Anns* broke down in *D&F Estates v Church Commissioners* [5] and the concept as defined in *Donoghue* broke down in *Caparo* [3].

Procedural Law

5.3.1 Introduction

“In the mind of the modern lawyer pleading and procedure are ancillary to the substantive law,... . Law is treated as a body of abstract rules which are applied to given fact situations. How those fact situations are put into pleadings and how the machinery of justice is initiated and kept in motion are procedural questions of limited jurisprudential interest. // Much of our legal history will defy comprehension unless this rigid separation of law and procedure is put out of mind...” .Baker [4, page 78]

The last section described the substantive English common law, that is, in our terminology of the description, the concepts and predicates of the language of the system. This section will describe some parts of the procedural law, that is, in the terminology of the description, the decision procedure of the system. We will focus on four parts of procedure and, in respect of each of them, we will look at how they have changed from the early to the modern common law. The four parts are, first, the conceptualization of law into forms of action and causes of action (section 5.3.2), secondly, modes of proof, trial and appeal (section 5.3.3), thirdly, pleading (section 5.3.4) and finally, precedent and *stare decisis* (section 5.3.5). We will also look briefly at one of the parts of the relatively recent reforms to the procedural law, the principle of proportionality (section 5.3.6).

5.3.2 The Conceptualisation of the Common Law - Forms of Action and Causes of Action

There is a distinction between the modern and the early common law as to how the law is conceptualized. In the modern period there is an abstract conception of the common law which makes the substantive law into a theory. That theory can be studied and discussed, as it is in textbooks and journals, without reference to its application. This is what we have called the substantive theory.

In the modern period, a claimant who wants to bring a claim must show that it has a cause of action. A cause of action is, broadly speaking, an assertion of facts that show that a substantive law has been breached by the defendant. It is this conceptualization of the common law that is described in this thesis.

In the early common law, there was no freestanding theory of substantive law (in the sense of a body of concepts and predicates or of rules that could be applied to any given fact situation), rather the substantive law and the procedural law were bound up together in the forms of action. A form of action was the structure and general parts of the writ by which the monarch conferred authority on the court to hear the claim.

The forms of action are relevant to the Description for at least two reasons. First, they illustrate the importance of the arbitrary position of the claimant on the development of the system. The first writs appear to have been developed on an ad hoc basis. Baker explains [4, page 78], "*The writs were not invented as a comprehensive system, but were responses to individual suitors for royal justice. Yet as common forms were established and the system rigidified, the writs were seen as an immutable framework of the law.*"

Secondly, a system based on forms of action is a different system from one based on an abstract theory of substantive law. Baker again [4, page 80]: "*New formulae were drafted by the masters of the Chancery. Once a writ had been used it became a precedent for the future... Thus a Plaintiff did not concoct his own writ but had either to fit his case into a known formulae or apply for a new type of writ to be invented. By the time of Edward I there were so many writs that the creative power of the masters was curtailed, and the only future developments were to be based on the kinds of writ then existing.*"

The early common law can be described according to our analysis as the application of the transformation rule. The distinction is that under the modern common law, the law

in the precedent is abstracted from it and expressed as a statement. Under the old common law, the law remains implicit in the precedent.

5.3.3 Proof, Trial and Appeal

This section refers to the decision procedure of the English common law. It begins with a comment on the difference in the decision mechanisms used in the early and modern common law, it then mentions two of the principles that apply to the modern decision procedure (being, natural justice and the burden of proof) and then refers to the appeal procedure.

There is a difference between the modern concept of a trial and the early concept of a proof. Baker states [4, page 78]:

“There is a great difference between “trial” in the modern sense and “proof”. To try a case suggests the weighing up of evidence and arguments by an intelligent tribunal. The early concept of proof implied a more absolute process, an appeal to the supernatural which avoided the risk of error inherent in human judgment. The ordeals, trial by battle, and to some extent wager of law, are all examples of the more primitive methods of proof” .

Under our analysis the ordeals were purely authoritarian, arbitrary decision making procedures. The reasoning element was confined to the interpretation stage of the procedure.

Our description of the modern trial is used, in its idealized form as the model for the rational trial described in chapter 3. Next we will look at two principles that apply to the modern common law decision procedure.

Natural Justice. Halsbury’s Laws of England, Volume 1 [10], defines natural justice as follows. *“Natural justice comprises two basic rules: first, that no man is to be a judge in*

this cause (nemo judex in causa sua), and, second, that no man is to be condemned unheard (audi alteram partem). These rules are concerned with the manner in which the decision is taken, rather than whether or not the decision is correct."

In terms of our analysis, the principles of natural justice specify the triangular structure of the rational trial.

Burden of Proof. The burden of proof in a civil trial is the requirement that the claimant must show on the balance of probabilities (ie, that it is more likely than not) that the facts supporting its claim obtain. It is not a rule that applies to questions of pure law, as, under the modern procedure the law is found by the judge having had the benefit of hearing the submissions of the parties. The findings of law are absolute, they are not stated on a probabilistic way. In terms of the System Analysis, they are semantically closed statements of what the law is.

Finally in this section, we will refer to the concept of appeal.

Appeal. The appeal procedure plays an important part in the rational trial. It is the model for the mechanism of level jumping to a more general level in order to find a rationalization or resolution to a deadlocked dialogue and it is the procedure by which decisions on issues can be reversed. Baker [4, page 59] puts the procedure in its historical perspective:

"In the modern sense, there was no such thing as an appeal at common law, and no procedures for bringing an appeal until the last [ie, nineteenth] century."

Whilst there were procedures that Baker identifies as forerunners of the appeal procedure, the important point is that these forerunners did not reverse the decision made on issues.

The purpose of the appeal procedure in the modern common law is described by, Lord Wolfe in his final report on "Access to Justice" [29, chapter 14] as follows.

"Appeals serve two purposes: the private purpose, which is to do justice in particular cases by correcting wrong decisions, and the public purpose, which is to ensure public confidence in the administration of justice by making such corrections and to clarify and develop the law and to set precedents".

In terms of the rational trial, the purpose of appeal is to provide an opportunity for issues that have been decided by a decision mechanism at one level to be rationalized at a more general level.

In order to include an appeal mechanism in the rational trial, we need some trigger to cause the mechanism to be initiated, that is we must answer the question: when will the rational trial cause a dispute that has been brought to an end, to be appealed? Our answer is that the appeal mechanism is triggered, if the losing disputant, by adopting a slightly different procedure than was actually used to produce the result against it, can construct a claim that undercuts (as distinct from merely rebutting) the *ratio* of the judge's opinion, then it should be appealed, unless the result in question has been produced at the highest level of appeal.

There are two motivating ideas behind this suggested trigger for the appeal mechanism in the rational trial. The first is taken from the doctrine of *stare decisis* which is described below and which means that, broadly speaking, that the procedure followed by a superior court is different to the procedure followed by an inferior court in so far as the superior court is bound by fewer precedents than the inferior court. Therefore, the first motivating idea is that if the losing disputant can show that the case would be decided differently against this different background, it should be given an opportunity of testing that proposition.

The second motivating idea behind the trigger for appeal in the rational trial is that a result that can withstand a slight change in procedure (that is, which would be the same under a different procedure) is likely to be more 'stable' and therefore likely to last for longer and to be followed than in subsequent cases than are results that cannot survive a slight change in procedure.

5.3.4 Pleading

Broadly speaking, pleading is the method by which the parties to a dispute make out their cases. However, there is a big difference between the modern process of pleading, by which a disputant sets out a concise statement of the facts which underpin its position and the old process of pleading, by which "*the [single] point in issue between the parties was defined before trial.*" [4, page 87]. We will make two observations on the early common law method of pleading.

First, under the early common law, the dialogue between the parties took place before the issue to be tried had been reached. Baker describes the arrangement as follows [4, page 92].

"Special pleading was the principle occupation of the narrators or serjeants at law in the early common law period...Pleas were tendered orally at the bar of the court by the serjeants and could be discussed by the judges and other serjeants before the party was bound by them...This gave the system a great deal of flexibility, but it also meant that all legal argument took place before an issue was reached. The issue, as the name suggests (exitum), was the end of a lawyer's task – the stage at which argument ceased to play any part and the matter was submitted to proof."

It is from this arrangement that we took the idea of a difference dialogue, which is concerned with the interpretation of law and the issue dialogue which is concerned with the resolution of inconsistencies, as described in chapter 3. On this analysis, the entire early common law process consisted of a difference dialogue which, if unsuccessful,

would lead to two competing interpretations of a law which would then be submitted to an arbitrary decision mechanism.

A related and important point about the early process was the rule against double pleading *“which prevented a party from advancing more than one plea was justified on the grounds that a mixed question of law and fact was incapable of trial, and that a party should not be permitted to draw out a dispute into numerous, perhaps never ending issues”* [4, page 96].

Secondly, the difference between general and special pleas and the three types of special pleas. In the early common law a general denial was the only form of defence available to the defendant. However, the development of trial by jury allowed for the separation of questions of law (which would be answered by the judge) from questions of fact (which would be answered by the jury). This allowed three types of special plea to become possible:

“(1) A party might traverse an allegation made by his opponent, that is, challenge its factual veracity. (2) Or he might demur to his opponent’s pleading, which means that he took some legal objection to it. (3) Alternatively, he might admit the facts alleged but adduce some further facts which excused him; this was called confession and avoidance. These were the only possible ways of attacking a pleading, and they comprehended every possible answer. But a party had to elect to pursue one course only, so that the pleadings would produce a single issue.” [4, page 91].

This corroborates that part of this description which asserts that the argument moves (the ‘pleas’ in the above quote) that are available to the disputants are dependent upon the type and configuration of the system in which their dispute is being played out.

Under the modern common law, pleading plays a far less important role. The modern practice is described in *Ian McPhilemy –v- Times Newspapers* [18] by Lord Wolfe as follows.

“Pleadings are still required to mark out the parameters of the case that is being advanced by each party. In particular they are critical to identify the issues and the extent of the dispute between the parties. What is important is that the pleadings should make clear the general nature of the case of the pleader No more than a concise statement of those facts is required. As well as their expense, excessive particulars can achieve directly the opposite result from that which is intended. They can obscure the issues rather than providing clarification. In addition, after disclosure and the exchange of witness statements, pleadings frequently become of only historic interest.”

Contrast this with the early nineteenth century attitude to pleading which is described by Chitty in the preface to his ‘Reports on Practise and Pleading decided in the Kings Bench in 1819’ which is quoted in a footnote in Fifoot [8, page 193] as follows: *“A very large portion of the time of the courts is occupied in discussing points of this nature, and the success of a suit depends greatly upon the regularity and accuracy of the proceedings”*. Under the early system, the pleadings were used to define the issue to be tried, under the modern system, they *“...make clear the general nature of the case...”* that is being advanced. The issues are then refined through the exchange of witness statements and documentary evidence before being finally set out in the lawyers’ opening submissions to the court.

It will be recalled, from chapter 3, that the number of issues in a case are controlled in the rational trial by identifying dependencies between issues and then trying the issues in order of importance (where importance is measured by the number of other issues that depend upon that issue). This type of issue management appears to operate in the modern common law, in which the issues are identified through a process that begins with pleading and in which any particularly important issue may be heard on its own at an early stage in the process as a preliminary issue.

5.3.5 Precedent and Stare Decisis

This section will comment on the modern doctrine of precedent, which appears to be at the heart of the modern system and at the heart of this description. Baker has this to say about the rule which is the model for the transformation rule of this description [4, page 105].

"... there is no trace until comparatively recent times of the doctrine that a precedent may itself have the force of law.//...The stricter view of precedent began to prevail in the eighteenth century, in some ways a period of stagnation in the common law. The expression stare decisis became popular, and an eminent judge [Buller J. in Bishop of London v Ffytche (1782), 1 East 487 at p. 495] said that it was one of the most sacred rules in the law. ...For a relatively short time the higher courts have even flirted with the idea of binding themselves by their own decisions, but in 1966 the house of lords made it clear that such a rule can only be a changeable rule of practice, not an absolute rule of law,..." This illustrates the changing balance between reason and authority within parts of the procedural law – precedents, which are sometimes referred to as ‘the authorities’, may at times be treated simply as touchstones to reason (see the quote from [4] in chapter 1) at others they are accepted as binding authority that must be observed.

In the Midland Bank [19], Oliver J. prefaced his restatement of the modern doctrine of *stare decisis* as follows.

"I have been led by Counsel through a bewildering complex of authorities many of which are not easy to reconcile with the principles established in subsequent cases in superior courts or, in some cases, with one another even the principles which [the judge] should follow when confronted by apparently conflicting decisions of superior courts are not always clear and, where they are clear, they are not always easy to apply, for their application may itself depend on a disputable interpretation of a decision of a superior court.\\ The principles so far as relevant to the present case appear to me to be these:

- (i) *A decision of the House of Lords resting on or establishing a general doctrine binds all inferior courts and represents the law of the land until it is altered by legislation or, nowadays, departed from by the House itself*
- (ii) *A decision of an inferior court may be treated as having been over-ruled by a decision of a superior court with which it is shown to be inconsistent, although it has not been expressly so stated by those who concur in such decision ...*
- (iii) *An interpretation of a statute or a decision of the House of Lords by the Court of Appeal is binding on that court even if it subsequently regards the interpretation as erroneous ... A fortiori such an interpretation binds an inferior court.*
- (iv) *Where there are conflicting decisions of the Court of Appeal, that court is free to choose which it will follow ... The position of a judge at first instance when faced with such a conflict is not clear. He must, I think, equally be free to choose unless it is suggested that he must follow that decision which is latest in point of time”.*

Oliver J's comments corroborate the assertion that the common law (and by this example, even its fundamental concepts such as *stare decisis*) is fuzzy and unclear.

5.3.6 The New Procedural Code

In the English law as presently constituted the conduct of a case in court is controlled by the Civil Procedure Rules 1998 (as regularly updated). These rules were fundamentally revised following the report of an enquiry into civil procedure by Lord Wolfe [29]. The new Civil Procedure Rules are set out in 75 parts. The first part, entitled 'Over-riding Objective', is completely new and has no equivalent in the former Rules of the Supreme Court. It states:

“1.1(1) These rules are a new procedural code with the over-riding objective of enabling the court to deal with cases justly.

- (2) *Dealing with a case justly includes, so far as is practicable –*
- (a) *Ensuring that the parties are on an equal footing;*
 - (b) *Saving expense;*
 - (c) *Dealing with the case in ways which are proportionate –*
 - (i) *To the amount of money involved;*
 - (ii) *To the importance of the case;*
 - (iii) *To the complexity of the issues; and*
 - (iv) *To the financial position of each party;*
 - (d) *Ensuring that it is dealt with expeditiously and fairly; and*
 - (e) *Allotting to it an appropriate share of the court's resources, while taking into account the need to allot resources to other cases."*

Part 1.2 requires the court to give effect to the over-riding objective and its interpretation of any rule and Part 1.3 requires the parties to help the court to further the overriding objective. The purpose of referring to this statement of the overriding objective is to show that the procedural law continues to develop in fundamental ways.

5.4 The Rules of Interpretation

Under our analysis, common law, legislation and equity are three different legal systems and they each have their own methods of interpretation. This section will comment on the methods of interpretation used in each and on the key attributes of legislation and equity suggested by our analysis.

Common law interpretation. The modern English approach to interpreting precedents is to identify that part of the precedent which is the *ratio decidendi* and then to use it to interpret the statement of substantive law in the precedent. There is much debate about the *ratio* of a precedent, what it is and is not and how it should be applied. Our general proposition is that the finding and application of the *ratio* of a precedent case is a process of interpretation that changes over time, therefore, it will not be bound to any

particular view as to how the ratio of a precedent should be determined or applied in any particular system.

We will also say something about the common law rules for the interpretation of contracts as this is illustrative of the reason based method of interpretation that characterizes common law. The starting point for rules for the interpretation of contracts is that the words of the contract are to be given their ordinary common sense meaning. In the terms of our analysis, this is their arbitrary meaning. The main problem that is addressed by the common laws of interpretation of contracts is what happens when the ordinary meaning is not clear or where it is obviously inconsistent with the intention of the parties to the contract. Previously, the general rule was that, in these circumstances, the court would not allow evidence of the intention of the parties to be put before the court. Lord Wright explained the principle in, as it stood in 1935, in *IRC v Raphael and Others* [16] as follows.

"The principle of the common law has been to adopt an objective standard of construction and to exclude evidence of actual intention of the parties: the reason for this has been that otherwise all certainty would be taken from the words in which the parties had recorded their agreement..."

Since then the principle has changed, the court will now, broadly speaking, permit evidence which shows the objective intention of the parties. Lord Hoffman said this in *ICS v West Bromwich Building Society* [15] about what evidence it was that the parties could call:

"Subject to the requirement that it should be reasonably available to the parties and the exception to be mentioned next [which was evidence of previous negotiations between the parties and their declarations of subjective intent] it includes absolutely anything which could have affected the way in which the language of the document would have been understood by a reasonable man."

Subsequent judicial statements have suggested that Lord Hoffman's definition of what evidence may be adduced, should be limited at least by the principle of proportionality referred to in section 5.3.6 above.

There are two points to make about rules for the interpretation of contracts. First, the easy observation that the principle has changed with time. Secondly, the more interesting observation that it is the arbitrary meaning of the words and the objective intention of the parties, as distinct from their subjective intentions, that are relevant to the court. This corroborates our description of the reason based approach of the common law as described in chapter 3. It assumes the existence of a single interpretation for the whole of the community of agents (that is, the 'objective interpretation').

Legislation. There are two points to make about legislation, first, its position in our analysis and, secondly, the extent to which it is subject to primary reinterpretation.

Under our analysis, legislation is law stated as a set of rules that are interpreted by a being linked to some arbitrary values. Baker describes medieval legislation as follows [4, page 100].

"Decided cases were illustrations or examples of what the law was, not "sources" of the rules in an authoritative sense. It is perhaps not an exaggeration to say that statutes were generally regarded in medieval times as examples, albeit put into certain words, of the same kind of law.//...the king was effectively head of the legal system and of the legislature. ...the king might give general directions to his judges for the future."

The points to be drawn from this quotation is that the legislative and judicial processes may not originally have been separate and that the rule making part of the process, that is, legislation, was grounded on authority rather than reason.

The second observation on legislation is that it is subject to reinterpretation by the common law method, that is, it is subject to being reinterpreted by agents by reference to precedents in which it has been applied. However, Levi argues that the courts take a different approach to the reinterpretation of statutes than the one that they take to the reinterpretation of precedents [14].

“There is a difference then from case law in that the legislature has compelled the use of one word. The word will not change verbally. It could change in meaning, however, and if frequent appeals as to what the legislature really intended are permitted, it may shift radically from time to time. When this is done, a court in interpreting legislation has really more discretion than it has with case law. For it can escape from prior cases by saying that they have ignored the legislative intent.// There is great danger in this. Legislatures and courts are co-operative law-making bodies. It is important to know where the responsibility lies. ... Therefore, it seems better to say that once a decisive interpretation of legislative intent has been made, and in that sense a direction has been fixed within the gap of ambiguity, the court should take the direction as given. ...//... therefore, it appears that legal reasoning does attempt to fix the meaning of the word. When this is done, subsequent cases must be decided upon the basis that the prior meaning remains, ...”.

The point that Levi makes, in terms of our analysis, is that legislation should be reinterpreted once by the decision process and then that interpretation be taken as a fixed point in the continuation of the discourse.

The general rule for the interpretation of statutes in the modern English common law is, again, that the words of a statute should be given their ordinary (“arbitrary”) meaning. Historically, the court was not permitted to look at the legislative debates that preceded the passing of the statute under consideration. This is subject to two exceptions. First, under *Pepper v Hart* [22] the exclusion of parliamentary material was relaxed. Lord Browne-Wilkinson stated: ... *“reference to Parliamentary material should be permitted as an aid to the construction of legislation which is ambiguous or obscure...”*.

Secondly, the Human Rights Act 1998, section 3, states: *So far as it is possible to do so, primary legislation and subordinate legislation must be read and given effect in a way which is compatible with the Convention [that is, the European Convention on Human Rights] rights*".

Equity. Baker [4, page 42], describes the genesis of equity in the court of Chancery as follows.

...in Tudor times lawyers were beginning to see a clear distinction between the type of justice administered in Chancery and the type administered in the Common Bench. ... The Chancellor, however, was concerned not with the rules but with individual cases. He was to proceed according to the dictates of "conscience" which transcended fixed rules.... Inevitably, the Chancellor's justice was seen as something higher than the less flexible common law.... The notion of justice working at different levels of generality had been expounded by Aristotle.... "The nature of the equitable", wrote Aristotle, "[is] a correction of law where it is defective owing to its universality"."

He then goes on to describe the often hostile competition between equity and the common law during the 16th and early 17th centuries, and then how *"During the seventeenth and eighteenth centuries equity consolidated itself as a system of jurisprudence separate from law"* and how *"the administration of law and equity was fused in the High Court"* during the reforms of the 1870s.

There are two points to note about equity from the perspective of our analysis. First, it is a separate system which, like legislation, has been merged with the common law system. Secondly, the distinction between equity and common law as systems is that under common law, the position of the decision maker is objective and general (what we have described as the reasonable position), in equity the decision maker is subjective and specific.

The method of interpretation in equity follows from the position of the decision maker. Equity interprets the parties positions through the so called principles of equity which are statements such as 'he who seeks equity must do equity' and 'equity looks on that as having been done which ought to have been done'.

This chapter has described parts of the English common law as the example on which our description of common law as a generic system was based. We cannot claim that this chapter corroborates our general description, but, it should illustrate our generalizations. The next chapter will evaluate this thesis and assess its contribution to the field of AI and law.

6. Evaluation. Contribution and Further Work

6.1 Introduction

This chapter evaluates the description, describes its contribution to the field of AI and law and describes some further work that could be carried out to develop the ideas put forward in this thesis.

The description is evaluated in three ways. First, by testing its power to explain the related work in AI and Law which was described in Chapter 4. This is contained in Section 6.2. Secondly, it is evaluated by testing its power to explain some characteristics of the English common law. This covers the second of our original criteria of adequacy which was that the description should be plausible where plausibility was measured by the number and sophistication of the characteristics of a common law system that can be included within the description. This is contained in Section 6.3. Thirdly, the description is evaluated by reviewing its position in a wider philosophical context. This is contained in Section 6.4.

Section 6.5 explains the intended contribution of the description to the field of AI and law and Section 6.6 sketches out some further work suggested by this description.

6.2 Evaluation by Reference to Related Work

6.2.1 Introduction

This section will evaluate the description by considering the four main pieces of work reviewed in Chapter 4. Those pieces of work were described in terms of the system analysis and this description in Chapter 4. In this section, we will build on those descriptions and consider how that related work can be developed to better achieve its own aims (if possible) and/or developed generally.

The general idea behind this method of evaluation is that, if related work can be described and developed by using the approach and concepts developed in this thesis, then that is a positive evaluation.

This thesis focuses on interpretation and the decision procedure within common law systems. These two parts of legal systems are not the focus of the related work. Therefore, in order to suggest developments in that related work, we will re-direct our focus onto the relationship between the substantive theory and the procedure in a particular system. This is a relationship that is revealed by our system analysis and the description, it is also a convenient way of looking at related work.

Our description of common law has shown that there are different types of substantive theory and different types of procedure and that the two are coupled in the English common law, the obvious example of this being the contrast between the early English and modern English common law. In the early English common law, no distinction was made between the substantive law and procedure, the form of action defined both the substantive law and the procedure adopted. In modern English common law, there is a theory of substantive law and a separate procedure based on the concept of a cause of action.

We will use the existence of a typology of theories of substantive law and of procedures and the existence of a relationship between them in analysing related work and suggesting developments to it.

We will take the related work in the same order that it appears on Chapter 4, being CATO, the Pleadings Game, P+S and value-based systems.

6.2.2 CATO

CATO consists of a substantive theory of factors in a factor hierarchy and a procedure consisting of some argument moves and a dialogue in which those argument moves may be made. The dialogue is about the applicability of the

precedent used in the first dialogue move. The output from the operation of CATO is one or more arguments.

CATO's substantive theory and procedure are consistent between themselves in that the structure of the theory (ie, the factor hierarchy) matches the argument moves that are available in the procedure. (This is hardly surprising as they were developed together).

The development in systems from HYPO to CATO to IBP is noteworthy. It shows a growing sophistication of the substantive theory used. In HYPO, the theory is simply a set of cases. Therefore, HYPO may be seen as pure case-based reasoning. CATO introduces a factor hierarchy. The factors have been extracted from the precedents and put in a hierarchy which is used to construct particular argument moves and to order dialogues which refer to multiple precedents in a way that would not be available in HYPO. Therefore, in the context of the development that we are describing, we might refer to CATO as a factor-based reasoning system. It is also tempting to suggest that the existence of the factor hierarchy in which the factors support P or D outcomes, renders redundant the underlying precedent from which those factors were taken. If an argument can be grounded on the factor hierarchy, then there is no need for the underlying precedent.

IBP develops the substantive theory further by organising it around a logical structure. This logical structure can be seen as an abstraction of the law of IBP's example domain, trade secrets. It sets out the categories of factor that must be satisfied by the claimant if it is to succeed in its claim. In the context of the development that we are describing, this can be seen as a type of rule-based reasoning where the logical structure is the schema for a rule which must be successfully instantiated by particular factors for the rule to apply.

Under our analysis, the cause of action is a part of the procedure that consists of a statement of facts sufficient to entitle the claimant to recovery. The sufficiency of that statement of facts as a cause of action depends upon whether or not they have satisfied a statement from the substantive legal theory. IBP's logical structure looks

like an abstract statement from a substantive legal theory that would be instantiated by a cause of action.

CATO's aim is to generate arguments that explain differences between precedents. We will suggest two developments for CATO which broadly work towards this aim. First, the link between the substantive theory and the procedure could be developed. Our review of the English common law suggests two ways in which this could be done. First, following the early common law, the factor hierarchy could be developed into a set of forms of action which would be frame-like structures. The factors from new cases would be used to instantiate the slots in those frames.

Secondly, following the modern English common law example, the developments seen in IBP could be continued whereby the substantive theory is further abstracted away from the specific factors of individual precedents and towards a more general substantive theory of the sort suggested by IBP's logical structure. The new case would then instantiate the logical structure in the same way that the facts pleaded in modern pleadings are required to disclose a cause of action.

The second development for CATO would be to try reversing the process followed by CATO (and which runs from factors to arguments) by trying to use arguments to find factors in precedents.

As presented, factors are manually extracted from precedents and given a P or a D value and inserted into the factor hierarchy. They are then used, during the operation of CATO, to instantiate argument moves. We assume that in real common law, this process is carried out dynamically during dialogues between disputants. CATO's process could be reversed as follows. First, treat the argument moves as schemata to be instantiated by factors. Secondly, use an argument move schema as the basis of a query of the factor hierarchy, the purpose of which would be to define the specification for the factor required to instantiate the particular argument under consideration in the particular dispute in question. The specification would consist of (i) a statement of the value of the factor (that is, whether it is required to be a P or a D factor) and (ii) a location in the factor hierarchy which would state what other

factor it had to support and in what way. The facts of the precedents could then be searched for a sentence that matched that specification.

6.2.3 The Pleadings Game

The substantive theory in the Pleadings Game is a system of legal defaults structured by a priority relation based on specificity. The procedure is a dialogue regulated by rules developed from Alexy's rules for a rational discourse.

The Pleadings Game assumes that the disputants both have their own interpretations of their default theories before they engage in the dialogue with each other and, therefore, they have a fixed position which they may not contradict and which may be challenged and must be defended.

The aim of the Pleadings Game is to find out whether or not there is an issue (or issues) between the parties.

The substantive theory and procedure of the Pleadings Game appear, under our analysis, to be slightly mismatched in at least two ways. First, the legal defaults are ordered by specificity and so it would be reasonable to expect that the procedure should take account of this, for example, by requiring "most specific legal arguments first" in order to promote efficiency of the system or perhaps by enabling the disputants to challenge the level of specificity of a legal default put forward by an opponent.

Secondly, the dialogue game used in the Pleadings Game takes as an input a default theory which consists of non-defeasible background information, rules of law and case-specific evidence which may or may not be defeasible. This suggests that the rules of the dialogue game should be written to deal with these different categories of data. For example, by first ordering the defaults and then instantiating them with non-defeasible fact and finally making good any gaps in the theory.

The aim of the Pleadings Game is to identify issues between disputants. A way in which the Pleadings Game could be developed would be to give it a typology of issues and to investigate in cases of multiple issues, the existence of dependences between issues so that it could be determined if, say just one or two out of many issues were decided, all the rest of those issues would then follow without having to be tried.

With respect to the typology of issues, our system analysis suggests that the type of issue depends upon the type of substantive theory and the procedure that is applied to it. In the Pleadings Game, the default theories held by the parties to the dialogue consist of a mixture of non-defeasible sentences, defeasible sentences and uninstantiated defaults. Therefore, the types of issue that could arise are:

- contradictions between non-defeasible sentences. For example, P says that priests are unmarried, D says that priests can be married. This sort of contradiction cannot be resolved within the existing interpretations of the parties' theories;
- contradictions between a non-defeasible sentence and a defeasible one. For example, P says that penguins cannot fly (we assume this to be non-defeasible), D says that most birds can fly (we assume this to be defeasible). It might be reasonable to assume that this sort of contradiction should be resolved in favour of the non-defeasible sentence. However, this does assume an underlying consistency of interpretation between the theories of the two disputants;
- contradictions between two defeasible sentences. Presumably, these could be resolved by looking at the specificity of the defaults from which they are conditionally entailed; and
- equally applicable defaults with different outcomes. For example, P says that professionals owe a duty of care to those they advise, D says that a professional does not owe a duty of care for advice given in a social (that is, non-professional) context. These would normally be resolved by specificity. However, there may be some circumstances in which the defaults are equally specific.

It also ought to be reasonably straightforward to develop a system from the Pleadings Game in which the facts and the law are separately stated to have separate dialogues dedicated to each of them.

In respect of issue dependency in the Pleadings Game, the success or failure of the plaintiff's main claim will depend upon the specificity of the legal defaults involved and the extent to which the defeasible facts that are needed to support those legal defaults are not defeated by other facts. This suggests that efficient issue management would be to order the legal defaults and then try the defeasible facts needed to instantiate the most specific legal defaults first. The only legal issue is the priority between two equally specific legal defaults.

6.2.4 P+S

In P+S, the substantive theory is a set of precedents each of which is represented as a set of rules, some of which are defeating and some of which are strictly defeating. The procedure is a dialogue which is subject to dialectical asymmetry.

Under our analysis, the substantive theory and procedure in P+S do not appear to be particularly well integrated for the following reason. Under the rule of dialectical asymmetry, a P can only win a case with a strictly defeating rule. It is reasonable to assume that the precedents in P+S were all decided under the same asymmetric procedure (if they were not, then what is the justification for the exchange of arguments presently being assessed being subject to this procedure). Therefore, the only rules favouring a P outcome that the precedents would contain would be strictly defeating rules. Therefore, if there was any rule available to the P, it would be strictly defeating and D could only ever expect to rebut it (in which case the claim would be defeasible).

The aim of P+S is to provide an abstract framework in which legal arguments can be assessed. They are assessed by reference to whether or not they are defeated by other arguments. Our first suggestion as to how P+S could be developed is a general

observation, rather than one specifically motivated by this thesis. It is that, to better achieve its aim, P+S could be developed by removing any parts of the abstract framework that cause arguments to be defeated, such as dialectical asymmetry, and adding parts to the abstract framework to enable it to accommodate as many as possible and as richly as possible, the specific substantive and procedural laws of the systems to be assessed.

Our analysis and description suggest that defeat between arguments is a matter of interpretation of the theories on which those arguments are grounded and that those arguments may be the products of competing systems. The interpretation of the theories on which the arguments are grounded is ultimately based on a mixture of reason and authority. This suggests that arguments need to be assessed in the context of the systems and theories in which they are put forward and P+S should be developed to take account of this context.

6.2.5 Value Based Systems

Under our analysis, the work on value based systems that we reviewed in chapter 4 describes, broadly speaking, a process of constructing the ratio of some type of judicial decision using a variety of undifferentiated systems. The contents of those ratios are factors (that is, they are relevant to law, rather than law themselves). It is not easy to analyse these value based systems by focussing on their substantive and procedural parts (as we have done with the other three items of related work) because it is not clear how, if at all, the substantive legal theory is represented. Therefore, in reviewing these value based systems, we will look at their theories (which we will call ratios, to avoid confusion) and the procedures by which those ratios are constructed, rather than at substantive theories and legal procedure.

Under our analysis, the ratios and the procedure that produces them do not appear to be particularly well integrated, because the construction procedure involves taking account of values and policies which, under our analysis, arise and take their interpretation from a system other than a precedent based system (such as common law, under our description). However, under the systems described, the only source

of these values and policies are precedents. One would expect the primary interpretation in a value based system to be a relation between a sentence of the substantive theory and an underlying theory and it would be this that would be the primary claim and the subject of secondary interpretation. One would also expect to find that procedures for interpreting value based law would have developed and be available in much the same way as different procedures are available for common law, statute law and equity as described in chapter 5.

The aim of the value based work is stated to be, broadly speaking, the investigation of reasoning with cases as a process of ratio construction. As suggested above, our analysis finds it difficult to rationalise these two approaches, for us reasoning with cases and reasoning with values are two separate systems. They may become mixed in the same way that common law, legislation and have become mixed in the modern English law, however, our example domain suggests that we should still expect to find separate approaches to interpretation.

Against a background of these comments, there are two obvious, but quite distinct ways in which the work on value based systems could be developed, first as a system of ratio construction and secondly as a 'pure' value based system.

In respect of ratio construction, it is clear that the judicial decisions of our example domain contain all sorts of different types of reasoning. We have not attempted to replicate the richness of this reasoning. Our description of 'pure' common law only allows for precedent based reasoning and suggests that all other types of reasoning arise from different systems. Therefore, our approach to developing a mechanism for constructing ratios of a richness equal to that found in the example domain would be to set up a number of different reasoning systems and permit them to interact with each other, for example by either supporting or attacking conclusions drawn from arguments constructed in different systems.

To develop a value based system, the obvious approach would be to list a set of values, specify primary interpretation as a relation between a sentence and one or more of those values and secondary interpretation as a method of testing and

changing that relation. The methods of primary and secondary interpretation could be by either reason or authority. We might say, for example, that the primary interpretation by reason would be a transformation rule that stated that if a sentence promoted a value then, it was a sentence of the value based theory.

6.3 Evaluation by Reference to the English Common Law

6.3.1 Introduction

This thesis is a description of common law. One of the criteria for its adequacy was plausibility where plausibility is measured by the number and sophistication of characteristics described. Therefore, it is appropriate to evaluate it by looking at the plausibility of its description of the English common law.

Having said that, there are at least two major respects in which the power of this thesis to describe the English common law will be limited. First, large areas of the English common law (such as criminal law, much of the non-contentious law and important areas of contentious law such as evidence and causation) have not even been mentioned and those that have been mentioned have, for reasons of space, only been referred to briefly. Secondly, this thesis is only a description and not an explanation. Therefore, for example, whilst we can describe, in general terms how *assumpsit super se* has developed over the last several hundred years, we have not even attempted to explain how this has happened.

However, within these limitations, we will evaluate the plausibility of our description in three ways. First, by reference to the number of characteristics that are included, if only in passing, in the description (section 6.3.2), secondly, by reference to its ability to describe at least at a conceptual level how a decision may be made in advance of it being made (although this is not to suggest that we can predict the outcome, section 6.3.3) and finally, by asking a purposefully difficult and ambitious question. The question we will ask, in section 6.3.4, is whether or not our description can explain the concept of justice.

6.3.2 Characteristics of the English Common Law Included in the Description.

We will look at the characteristics of the common law included in our description in two ways, first, by simply listing some of the characteristics described and, secondly, by returning to the examples given in chapter 1 and seeing if we can explain them.

The following characteristics are included in our description and have been referred to elsewhere in this thesis: the rule of precedent and how it has changed over time, the judicial process, fuzzy substantive legal concepts (such as common law duty of care), how they are constructed and how they appear to change over time both at a first and second order level, the difference between legal concepts and the ratio of a precedent containing factors that are relevant to that concept, a tenable way of distinguishing common law from other legal systems (such as legislation and equity), the extent to which sentences of substantive legal theory are rules and the competing roles of reason and authority in common law.

We have also described a range of procedural laws in chapter 5.

In chapter 1 we gave some examples of the way in which common law changed and we also quoted from work on jurisprudence by Sartorius [25] and MacCormack [17]. We will briefly explain those examples and quotations in terms of our description. Our example of long term substantive change was the development of the various constituents of the law of obligations, our example of medium term change was the development of the modern law of negligence from Donoghue [8] to Caparo [3] and our example of short term change was the three decisions in Hedley Byrne [11,12,13]. Under our analysis and description, all three are examples at different orders of magnitude, of repeated reinterpretation.

Our example of long term procedural change was the change in the mode of trial from the pre-common law ordeals to the modern common law judicial process. We explain this, under our description as a change of decision mechanisms from authority based to reason based. Our example of short term procedural change was

the practise direction of 1966 [23] which permitted the House of Lords to depart from their own earlier decisions. Under our description, that is an authority based change to stare decisis which itself is an authority based part of the overall common law decision procedure. The coupling of reason and authority in our description of common law is well illustrated by the doctrine of stare decisis. It is an authority based doctrine, in that it requires a court to follow precedents without reason, but in doing so, gives effect to the application of the rule of precedent which is a reason based mechanism.

The quotations from Sartorius and MacCormack in chapter 1 concerned the use of principles in judicial decisions. They both emphasise a weight of interrelated legal authority which must, somehow, contain grounds for a rational decision. We commented that it was difficult to see how they could be implemented into a mechanical system. We now assert that our analysis is a successful attempt to untangle some of the many threads that were collected up into the mass of "*the reason of the law*" alluded to by Sartorius and MacCormack.

6.3.3 How a Decision is Made.

In chapter 1 we quoted Palmer's [19] criticism of work in AI and law that relied upon argumentation frameworks and codified priority relations. That criticism implied that whilst these and other logical tools may be used to reconstruct a decision after it has been made, they cannot be used to capture the "*creative invention*" of legal reasoning and the "*organised chaos*" of the body of law from which legal arguments are constructed. Whilst we do not claim that, on the strength of this thesis, we can predict or construct any particular decision in advance of it being made, we will claim that our description is a plausible description in general terms as to how a decision might be made by a common law system.

6.3.4 Justice

As mentioned in the introduction to this section, we have set ourselves, by way of evaluating our description, the purposefully ambitious task of stating what our

analysis and description has to say about the concept of justice. We might justify raising this question by suggesting that any description of law that claims as much as we do should bring with it some sort of theory of justice. We will only answer the question in the briefest terms and we will not even attempt to give the question its proper context of other main theories of justice.

The concept of justice arising out of our description arises directly from the dynamic nature of the system.

From the perspective we have taken, legal systems change with every decision at every level of granularity. Once we have taken this position, one of the main challenges is to explain how the system maintains stasis, that is, how it is that parts of the system appear to stay the same for long periods of time and that the system as a whole can perpetuate through time, why is it that the system does not fragment into a set of discrete sub-systems, what is it about the systems that give its agents a sense of its continuity despite the fact that they are continually reconstructing it.

Our answer to this type of question is that justice is a condition of the system in which the system is balanced between change and stability. The system is just if it is sufficiently flexible to accommodate change in its domain of application and sufficiently stable to enable its agents to predict, with reasonable certainty whether or not the private, primary interpretations that they construct by application of the rule of precedent are likely to pass the decision procedure of the judicial process.

6.4 Evaluation in a Wider Knowledge Representation Context

6.4.1 Introduction

This method of evaluation is to test this thesis against more general criteria of adequacy and to consider whether or not there are any more general objections to it. We will look at the general adequacy of the description in Section 6.4.2 and, its general philosophical position in Section 6.4.3.

6.4.2 General Knowledge Representation Adequacy

We will evaluate our analysis and description by applying the four general criteria of adequacy for knowledge representation systems referred to in [30] which are metaphysical, epistemic, heuristic adequacy and computational tractability.

Metaphysical adequacy requires there to be no contradiction between the subject matter represented and our representation of it. We have grounds to believe that the description has satisfied this criterion in that we have not found any characteristic of common law that, because of the overall structure and underlying assumptions of our approach, would be wrongly or misleadingly represented.

Epistemic adequacy requires the method of representation to be able to represent the subject represented. Our method of representation has been to use a language based moving classification system that we have developed for the very purpose of representing the common law, it satisfies this criterion.

Heuristic adequacy requires the representation mechanism used to be able to express the reasoning that has been carried out in order to reach the solution to the problem represented. Our description is perhaps weakest on this criterion because of the abstractions and simplifications that we have chosen to make. We have acknowledged that the judicial decisions in the example domain contain a rich mixture of many types of reasoning. We have not sought to describe how this rich mixture is produced, instead, we have abstracted out of it, one system, common law, and concentrated on describing parts of system as defined in our own terms. We can explain how a decision is reached by our abstract idealised description, but we can hardly begin to explain how a complex ratio is constructed.

The final criterion is computational tractability. We have used a watered down version of this criterion by requiring our description to be mechanical. We have not been concerned with the practical challenges of tractability since we are still only at the stage of producing a conceptual description.

6.4.3 The General Position of the Description

Our description and approach has been deliberately fundamental and wide ranging – we have identified what we assert to be some basic concepts (agents, a language and reason and authority based processes) and built our description from them. We ought reasonably to expect to locate such a fundamental approach in a wider philosophical context and to be reassured as to its value if we can and concerned if we cannot. Therefore, the purpose of this section is to locate the thesis in the wider intellectual traditions. We will do this in two ways, first by describing our description as part of the constructivist approach and contrasting this with what we will call the logicist approach of other work in AI and law and, secondly, by looking at the solution suggested by our description to a general philosophical problem known as the sorities paradox.

Our constructivist approach. We have taken the term ‘constructivist’ from the philosophy of mathematics and of logic, see [31 and 32] for introductions, in the more recent past (the past century or so) constructivism has also been labelled ‘intuitionism’ particularly to describe logical systems that do not include the law of the excluded middle.

Very broadly speaking, philosophically, constructivism can be described as an alternative to realism. The contrast between the two approaches is seen in their different ways of dealing with infinite concepts. There are two forms of a concept, the intentional and the extensional. The intensional is what we would intuitively describe as the definition of the concept, the extensional is a list of all members of the concept. We have assumed that negligence, assumpsit, contract, etc are infinite legal concepts. The intensional form is the statement of law that follows the legal predicate in judicial opinions (we have quoted examples from Donoghue and Hedley Byrne earlier in this thesis). The extensional definition is the list of cases in which those concepts obtain.

The realist asserts that every concept has a well defined extensional set, even if it is infinitely large. *"The intuitionist denies this. What correspond to these concepts [ie, infinite concepts] are operations or procedures – intensional notions. For example, the concept 'natural number' is constituted by a process or operation of successively adding 1."* [31, page 214]. Our description is constructivist in that it asserts that legal concepts are only what have been constructed by operation of the rule of precedent and the judicial process. This *operation or procedure* is based on precedents which can only ever form a tiny fraction of all the cases that make up the domain (indeed, the idea of the domain consisting of a set of cases is equally a construct) and which the realists would need to list in order to complete their extensional definition.

Having characterised our approach as constructivist, we can then characterise the approach taken by much of the related work in AI and law that we have looked at as logicist, where a logicist is, very broadly speaking a realist knowledge engineer. As we have said in chapter 4, we take P+S to be a product of the logicist approach, it is founded on a logical layer in which arguments can be said to be either valid or invalid. This assumes that the law of the excluded middle applies to these arguments. Under our approach, we are only able to state that an argument is valid or invalid once the operation or procedure has come to an end for the time being.

This locates our approach and description in a wider philosophical context, next we will look at what contribution our approach might suggest to a general philosophical problem, the sorities paradox.

The sorities paradox. *"The Sorities Paradox is usually attributed to Aristotle's contemporary Eubulides, the Megarian philosopher who, ... is also accredited with inventing the purest form of the Liar Paradox. The argument proceeds little by little to take us from truth to falsehood. For example, two are few and three are few and whatever number we have which is few, adding one more does not take us from few to many. So, by 9,998 steps we reach the absurd conclusion that 10,000 are few ... one stone does not make a heap [the word "sorities" is Greek for heap] adding only one stone to what was not yet a heap cannot make a heap. So heaps don't exist ..."*

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In whatever form the challenge of the Sorities argument is to identify the cut-off point two are few; 10,000 are not. Where does the cut-off point come? Is there a number, n , such that n are few but $n+1$ are many?" [31]

The likely presence of the sorities paradox in our description is suggested by the fact that it appears to apply to classes of things such as stones (which might be described as a heap) or precedents (which might be described as a legal concept). It shows itself in our example domain as the practical judicial problem of where to draw the boundary of a legal concept. The maker of a statement is under a duty in respect of the accuracy of that statement (as was decided in *Hedley Byrne*), but, *"To hold the maker of a statement to be under a duty of care in respect of the accuracy of that statement to all and sundry for any purpose for which they may choose to rely on it is...to subject him, in the classic words of Cardozo CJ, to 'liability in an indeterminate amount for an indeterminate time to an indeterminate class (see Ultramares Corp v Touche (1931) 225 NY 170 at 179)"* [3, at page 576].

The approach to solving to the sorities paradox suggested by our description is that at each step in the chain of incremental reasoning in respect of a vague concept such as a heap or negligence or assumpsit, that concept must be reconstructed.

6.5 Contribution

Our aim is to provide a description of common law that can stand as a conceptual under-pinning for formalisms and implementations of AI and law.

We will illustrate this contribution by summarising some the choices and decisions that a knowledge engineer might take to specify common law-type systems designed to achieve the aims of the three main pieces of related work that were reviewed in Chapter 4 on the assumption that that knowledge engineer was following our analysis and description.

First, CATO. The aim of CATO is to generate arguments that explain differences between precedents of the types used in CATO. Our knowledge engineer:

- would represent precedents as containing three parts, the decision, the sentence of substantive law on which the decision is based and factors that are relevant to that sentence of law. Factors would then be organised by reference to the element of the sentence of law that they supported or attacked, as is the case in IBP. Multiple precedent arguments would be organised by the substantive law that was common to all those precedents and there would be no need for a factor hierarchy to carry out this role;
- would specify the argument moves by reference to the rule of precedent as implemented in the system being represented and the critical questions that are raised by each element of that rule. CATO's argument moves follow this approach generically, however, they do not account for the specific implementation of the rule. For example, if the rules of stare decisis were incorporated into such a system, arguments about procedural priority could be constructed; and
- would know that a difference dialogue ends in either resolution (by which all factors are explained in a single consistent theory) or deadlock, and could, therefore give the disputants a strategy on choosing precedents and critical questions which, if possible, achieve resolution for their desired result. This would result in the underplaying and emphasise on various different factors without the need for the factor hierarchy.

The aim of the Pleadings Game is to find issues. Our knowledge engineer would:

- know that issues are inconsistencies in a substantive legal theory and that their typology depends upon the structure of that theory and the decision procedure by which its sentences are tested and, therefore, would specify the forum in which the dialogue between the disputants was mediated to find the type of issues suggested by the substantive theory and procedure in question, rather than use a generic specification such as suggested by Alexy;

- knowing that the type of argument moves permitted may obscure or reveal the issues, the knowledge engineer would specify moves that revealed issues. For example, he would not permit a bare denial;
- know that the absence of issues indicates a semantically closed theory and, therefore, might require the disputants to put forward complete positive case at the beginning of the dialogue in order to investigate whether or not they are arguing from semantically closed positions.

P+S aims to stand as an abstract framework in which legal arguments can be assessed. Our knowledge engineer would:

- know that the purpose of legal arguments, from one perspective at least, is to construct a theory on which validate those arguments, therefore arguments may be assessed not only by the extent to which they are protected from attack, but also by the condition of the theory on which it is grounded. If the theory is not semantically closed, an argument grounded on it cannot be defended against all attack;
- know that disputes end either in deadlock and the application of a decision mechanism or in resolution/rationalisation and that justified arguments (using the terminology of P+S) are those which achieve resolution/rationalisation. Therefore, assessment could be calibrated by the reason or reasons why an argument cannot achieve rationalisation/resolution;
- know that, quite aside from argument, legal decisions are made to a greater or lesser extent by authority, therefore, the measure of assessment must take into account the way in which the status of an argument is a product of authority based aspects of the legal system under consideration.

6.6 Further Work

We will end this thesis where we began, with the original motivation. This was to build a programme of obvious practical use such as an automated legal adviser which

Would make use of a freely available database precedents. How much closer are we now to achieving that goal? What further work is there to do?

We accepted that in order to properly achieve that goal we would need to be able to explain "*creative invention*" of legal reasoning or the "*organised chaos*" of the body of law (Palmer's [19] phrases). We have taken the first step towards achieving that aim, we have set out an initial description of one part of the law which suggest that the characteristics that we seek to replicate lie in the interaction between several partially merged legal systems and we have used an analysis which can be reused in the further investigation of these systems and their interaction. The thesis implies a programme of further work in developing the description of common law into a description of legal systems generally and then developing that description into an explanation and into a formalism and into an implementation.

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APPENDIX 1 :

An Example of the Operation of Common Law under this Description

The purpose of this Appendix is to give a specific example of how common law, as described in this thesis, operates using the terminology used in this description.

The example will be loosely based on the facts and decisions in *Hedley Byrne v Heller* [11, 12, 13], the idea being that it should lead up to the extract of the opinion of Lord Morris in the House of Lord's Judgment.

The Facts

The Claimant was an advertising company. It asked its bank to obtain a financial reference for one of its customers ("Easipower"). The Defendant was Easipower's bank.

In order to meet the Claimant's request, the Claimant's bank asked the Defendant for a financial reference for Easipower.

The Defendant gave a good reference for Easipower. This reference was passed back to the Claimant and, in reliance upon it, the Claimant took responsibility for payment for advertising space for Easipower.

The reference turned out not to be accurate, Easipower could not meet its obligations to pay the Claimant for that advertising space and the Claimant lost money.

The Parties and their Arbitrary Positions

Under this description, the Claimant and Defendant are two agents of the system. The Claimant believes that it has lost money in reliance upon statements made by the Defendant. This is the Claimant's arbitrary position. It is a "position" insofar as it has a relation to another agent, the Defendant. It is arbitrary insofar as it exists irrespective of and prior to the application of any legal process or analysis.

The Claimant is motivated by self-interest to recover the loss that it has suffered.

Primary Interpretation

Following its self-interest, the Claimant wants to classify its relationship with the Defendant in such a way as to enable it to recover the money it has lost.

The report of the decision at first instance [11] states that the Claimant cited *Batts Combe Quarry Co v Barclays Bank* [(1931) 48 The Times L.R.4] “*as authority for the proposition that an action could be brought on the ground of negligence in the making by a bank of a representation as to a customer’s financial standing*”.

Therefore, we will assume the Claimant applies the rule of precedent which we will refer to as the transformation rule of the common law, to draw the conclusion that its own situation (which is referred to as “the new case” in this thesis) is in the same class as a previously decided case (“a precedent” – the *Batts Combe Quarry* case) and, therefore, an action for negligence could succeed in the new case.

This application of the transformation rule by the Claimant results in an interpretation of a legal concept, that is, the legal concept of duty is given meaning by being linked to a precedent (*Batts Combe Quarry*, in this case). Therefore, the primary interpretation of the concept is made by a relation to a precedent rather than, say, a relation to a value or by a pure assertion of authority (such as “it is law because I say so”).

Note two points about the primary interpretation. First, it takes place before the judicial process has begun, before there is any indication of a dispute and that this primary interpretation is not necessarily accepted by other agents and that it is incomplete and uncertain in scope in that no other precedents, but, *Batts Combe Quarry*, and no other description of the new case, but, the Claimant’s, have been taken into account.

Secondly, the primary interpretation is carried out in the context of other statements of common law. We will call this context the substantive theory of the common law. It is substantive as distinct from procedural. It is a theory in that it is a set of sentences in the language of the common law.

Decision Making by the Agent

It may be that the Claimant finds its present situation to be a “hard case” in that:

- it cannot find a similar precedent (according to the interpretation of the Claimant’s existing legal position); or
- it finds two equally similar, but contradictory, precedents.

When faced with a hard case, an agent will be forced to make its own decision in order to construct a primary interpretation. One of the conditions of adequacy that this description must meet is that it must be mechanical. To meet this condition, we will assume that agents reach decisions by carrying out, internally, the same basic process as is carried out between agents in the judicial process. For example, the agents may conduct internally, dialogues of the sort carried on between litigants in the judicial process.

Whilst an internal dialogue is the same basic process as used in the judicial process (ie, a dialogue), it will be conducted subject to different rules of procedure.

Legal Position and Differences

The application of the transformation rule gives the Claimant a legal position, that is a common law sentence by which it can describe its social relations with another agent, the Defendant such as “the Defendant banker owes me a duty to be careful in giving a reference”.

Neither the Defendant nor any other agent will have been motivated by self-interest to construct a legal position arising out of the facts and we will assume that they have—

that done so. Therefore, there will be a difference between the Claimant's legal position and the Defendant's.

Agents with different legal positions may not encounter each other and their differences may remain unexamined. We assume that the Claimant was motivated to engage with the Defendant and to find out whether there was a difference between positions (or whether the Defendant in fact accepted the Claimant's claim that it owed a duty to be careful). In light of the incomplete and uncertain scope of the Claimant's interpretation and on the assumption that the Defendant's position is similarly fuzzy, it may not be easy to establish the differences between the two of them. The initial exchange between them may consist of a mixture of claims, questions, assertions and other moves, by which the parties understand their opponents' positions and develop their own. This description only considers one type of exchange – a dialogue.

We will call this initial exchange a difference dialogue. It is also the first stage in the description of the judicial process, see below.

The Claimant and the Defendant are unable to compromise their differences. Therefore, the Claimant begins the judicial process, which is the decision procedure of the common law, by taking action against the Defendant. The Claimant takes action by showing a cause of action.

The Judicial Process – The High Court

Under this Description of the common law, we will call our description of the Judicial Process “the rational trial”.

The rational trial begins in the first of the three levels of the appeal hierarchy, the High Court. It begins with a difference dialogue between the disputants. Such difference dialogues have been modelled in AI and Law: Gordon's Pleadings Game (1991) addressed just this stage in the process.

The High Court proceedings begin with the Claimant putting its claim and the exchange of pleadings between the parties. Pleadings are statements of fact which ground the parties' respective legal positions. The exchange of pleadings is a type of difference dialogue in that its purpose is to establish where, on the facts, the parties' positions coincide and where they differ.

There may be as many different types of difference dialogue between the parties as there are types of difference between them.

Since the thesis is concerned with questions of pure law and with interpretation, the rational trial includes a difference dialogue which is to resolve or establish differences of interpretation. This has the added benefit of being able to adopt argument moves from previous work on case based reasoning (see below).

One characteristic of a difference dialogue is that it takes place against very limited interpretation – the Claimant is bound by its first interpretation (the scope of which is fuzzy). The Defendant is not yet bound by any interpretation.

The input into the difference dialogue is the Claimant's claim, grounded on its primary interpretation. The dialogue then consists of a series of moves. The first of those moves is made by the Defendant and it attacks the Claimant's claim, moves attack the move immediately preceding them.

The difference dialogue is regulated by the judge. It comes to an end in one of two ways. It may be that one of the party's moves defeats the other party's move and the dialogue is decided in favour of the defeating party. If the Claimant is the defeating party, then its claim stands, if the Defendant is the defeating party, then the claim fails. If, however, neither party succeeds in defeating the other, there is deadlock between the argument moves with the party.

The following illustration uses two of the three argument moves from HYPO [35] which are: (i) cite a favourable case (the same as making a claim as described above), (ii) cite a counter-example; and (iii) point out a distinction in a previously cited case.

Claimant cites Batts Combe Quarry (we will assume, for simplicity, that the Claimant's claim is the same as its application and the transformation rule, as described above).

In respect of the Defendant's move, the report of the decision at first instance states *"The Defendant's submission was that the only duty was to give an honest answer. That limitation, it was argued was implicit in the reasoning of a long series of authorities from Derry v Peek ((1889) 14 App. Cas. 337) and was finally determined to be correct by the House of Lords in Robinson v National Bank of Scotland ((1916) 53. S.L.R. 390).*

Therefore, we will assume that the move made by the Defendant in the difference dialogue was the citation of Robinson v National Bank (in which the facts were quite similar to those of the new case – the Claimant in that case was claiming losses suffered in reliance upon a banker's financial reference) as a counter-example.

Since the claimant is unable to distinguish Robinson v National Bank from the new case, there is deadlock between the Defendant's counter-example and the Claimant's example and the point of deadlock is the issue between the parties. The issue is whether or not a banker owes a duty other than to be honest (ie, not to be fraudulent). The Judge described the issue as follows.

"The claim as so put raises in a neat form the question whether, in circumstances such as these, a person who has acted on a banker's reference so given can succeed short of proving fraud". Quoted from a quotation of the decision at first instance contained in the Court of Appeal decision.

The outcome of this difference dialogue is that there are two competing interpretations (ie, there is an inconsistency in the law). Note that the issue itself is slightly different from the original claim, in that the question of the banker acting fraudulently has been introduced.

The issue cannot be resolved between the disputants. The issue polarises the positions into interpretations so that each of the moves made by the disputants can be, if necessary, constructed into complete arguments grounded on one of those two interpretations. Note that neither of the competing interpretations are particularly clear cut.

The Judge's Decision – The Issue Dialogue

The next stage of the rational trial is the issue dialogue. The general idea is that this is a dialogue conducted internally by the judge about the issue between the parties.

In the judicial process, the issue dialogue has been “externalised” in the sense that the court invites submissions from the parties on the issue and these are moves in the issue dialogue. However, in this example, we use an internal dialogue.

In conducting the internal issue dialogue, the judge is not bound by either of the competing interpretations constructed by the parties. The judge is not even bound to assume that they are inconsistent.

However, since there are two competing interpretations, the moves made in the issue dialogue can more easily be seen as complete arguments, grounded in the competing interpretations, than as argument moves (as are put forward in a difference dialogue).

The issue dialogue comes to an end in one of two ways. First, it may encounter a further issue (ie, there is deadlock between the two positions in the issue dialogue), in which case the judge imposes a decision by authority. Second, one of the parties may not be able to maintain its position under the interpretations constructed by the judge and the two positions are rationalised into a single position.

It is the second type of ending that occurs in the first instance decision of Hedley Byrne. The House of Lords decision in *Robinson v National Bank of Scotland* takes priority over the first instance decision in *Batts Combe Quarry* and, therefore, “*His Lordship was accordingly driven to the conclusion, by the authority binding on him, that no such actions lay in the absence of contract or fiduciary relationships*”. It is

worth noting that the quote referred to above continues: “*His Lordship added that he was satisfied that a passage in Batts Combe Quarry ... where [the judge] was reported to have said that there was a duty not to be negligent, had been misreported*”.

The judge, the parties and all other agents are bound by the interpretation in the judge’s decision (subject to their interpretation of it). However, the parties may appeal the decision.

In Hedley Byrne, the Claimant appealed the first instance decision to the Court of Appeal.

Appeal to the Court of Appeal

In the rational trial, an appeal is represented by as a claim (ie, a complete argument accepted by the lower court) put forward by the appealing party about the reasoning of the judge at first instance, followed by an internal issue dialogue conducted by the appeal judge.

For example, in Hedley Byrne, the report of the decision in the Court of Appeal states that the Claimant “*founded an argument on the passage in the speech of Viscount Haldane in Robinson v National Bank of Scotland where he said that: [aside from fraud, the courts may find a duty of care arising from other special relationships]*” [page 900, 12].

In conducting the internal issue dialogue, the appeal judge is not bound by the interpretation of the trial judge or of the appellant. The appellant judge is also subject to different procedural constraints in that the rule of stare decisis is different for the High Court and for the Court of Appeal.

In the Court of Appeal, the leading opinion was given by Pearson LJ. The record of his judgment in the Law Report can, very broadly speaking, be represented as an internal dialogue as follows:

Issue:

“On the facts as stated and assumed, was there a duty of care, and are the Plaintiffs entitled to recover damages for negligence? The leading case is Derry v Peak ...”;

D. Argument:

He then puts forward the first argument by working through a chronological series of precedents beginning with Derry v Peak and citing passages from them, that support the proposition that *“a false statement, carelessly, as contrasted with fraudulently, made by one person to another, though acted upon by that other to his detriment, was not actionable in the absence of any contract or fiduciary relationship between the parties ...”* (quoted by Lord Pearson from the head note of Candler v Crane Christmas [1951 1 All ER 426 [page 895E to page 900F]. In producing this interpretation, he distinguishes two cases on their facts;

C. Counter-argument:

He then states the counter-argument by referring to the Plaintiff's submission that there was a special relationship between the Claimant and the Defendant and that the statement of Viscount Haldane in Robinson v National Bank of Scotland was authority for the existence of such special relationships.

“Counsel for the Plaintiffs ... suggested that there was, in this case, a relevant special relationship inasmuch as the Defendants were financing Easipower, Limited, and that company depended for its survival on such financing by the Defendants being continued.” [Page 900I to 901];

D. Argument:

Pearson LJ puts forward his second argument which attacks the counter-argument on grounds that: *“The*

special relationship required to establish the duty of care as between A and B must be a special relationship existing between A and B". He then cites authority to support this proposition and distinguishes the new case on grounds that the special relationship was between the Defendant and Easipower not between the Claimant and the Defendant.

Thus, his opinion is a rationalisation insofar as the Claimant's arguments have not been formed into an extension.

The House of Lords

Hedley Burn was appealed to the House of Lords where a finding in favour of the Claimant was made.

In the rational trial, this further appeal is again represented as a further issue dialogue.

This is an analysis of a single extract from one opinion. It is an extract from Lord Morris' opinion in Hedley Byrne.

We will summarise the extract by quoting:

- i. the meta-comments of the opinion by which Lord Morris flags up to his immediate audience (being the other Lords of Appeal who are also to give opinions in the case) and to his wider audience (being the parties in the case and community of agents), the steps that he is taking in his reasoning; and
- ii. the premises and conclusions of the chain of arguments of the *ratio* that he has constructed.

The *ratio* naturally presents itself as an internal dialogue of arguments(moves) and counter-argument moves. A conclusion has been added to each argument move in

the analysis below. The direct quotes are, as usual, in italics. The page and paragraph numbers from which they are taken are in brackets

The extract is as follows.

Argument Move 1:

Premise1:

Law authorised by precedent: *"it seems to me that if A assumes a responsibility to B to tender him deliberate advice there could be a liability if the advice is negligently given."*..(p.588H), even if given indirectly(p.589F);

Premise2:

"I can see no difference in principle in the case of a banker"(p.589D).

Conclusion: A banker may be liable for negligently giving deliberate advice..

Counter Arg Move1: (attacks Argument1):

Premise: Law authorised by precedent *"It is said, however, that where careless (but not fraudulent) misstatements are in question there can be no liability in the maker of them unless there is either some contractual or fiduciary relationship with a person adversely affected by the making of them unless through the making of them something has been created or circulated which is dangerous to life limb or property."* (p.590A);

Conclusion:A Defendant is not liable to a claimant for a careless statement unless there is contract or a fiduciary duty or danger to persons or property.

Argment Move2: (attacks the qualification in Counter Argument Move1 – which is the part underlined in the quote above):

Premise: *"In logic, I can see no essential reason for distinguishing injury which is caused by a reliance on words from injury which is caused by reliance on the safety of the staging of a ship..."* (p.590B)

Conclusion: There should be liability for careless statements if there is liability for careless acts.

Argument Move3: (attacks, by rebuttal, the main clause of Counter Argument Move1):

Premise authorised by citation of *Cann v Willson* [2]. *"Leaving aside cases where there is some contractual or fiduciary relationship there may be many situations in which one person voluntarily or gratuitously undertakes to do something for another person and becomes under a duty to exercise reasonable care"* (p.590D)

Counter Argument Move2: (attacks, by undercutting, Argument Move3):

Premise: *"[Cann v Willson] was overruled by the Court of Appeal in Le Lievre v Gould "* (p.591H).

Conclusion: The premise of Argument Move3 is unauthorised and Argument Move3 fails to rebut the main clause of CounterArgument1.

Argument Move4: (attacks, by undercutting, Counterargument Move2):

Premise: The decision in *Le Lievre* interpreted the House of Lords decision in *Derry v Peek* to *"by implication negative the existence of any such general duty of care as laid down in Cann v Willson"*. (p.592C)

Premise, authorised by the House of Lords decision in *Nocton v Lord Ashburton*: *"My lords, guided by the assistance given in Nocton v Lord Ashburton I consider that it ought not to have been held in Le Lievre v Gould that Cann v Willson was wrongly decided.."*

Conclusion: Argument Move3 is justified, therefore, Counterargument Move 2 fails and Argument Move1 succeeds.

Lord Morris then goes on to say (594B): *“My Lords, I consider that it follows and that it should now be regarded as settled that if someone possessed of a special skill undertakes, quite irrespective of contract, to apply that skill for the assistance of another person who relies on such skill a duty of care will arise...”*

6.4.3 The General Position of the Description

Our description and approach has been deliberately fundamental and wide ranging – we have identified what we assert to be some basic concepts (agents, a language and reason and authority based processes) and built our description from them. We ought reasonably to expect to locate such a fundamental approach in a wider philosophical context and to be reassured as to its value if we can and concerned if we cannot. Therefore, the purpose of this section is to locate the thesis in the wider intellectual traditions. We will do this in two ways, first by describing our description as part of the constructivist approach and contrasting this with what we will call the logicist approach of other work in AI and law and, secondly, by looking at the solution suggested by our description to a general philosophical problem known as the sorities paradox.

Our constructivist approach. We have taken the term ‘constructivist’ from the philosophy of mathematics and of logic, see [31 and 32] for introductions, in the more recent past (the past century or so) constructivism has also been labelled ‘intuitionism’ particularly to describe logical systems that do not include the law of the excluded middle.

Very broadly speaking, philosophically, constructivism can be described as an alternative to realism. The contrast between the two approaches is seen in their different ways of dealing with infinite concepts. There are two forms of a concept, the intentional and the extensional. The intensional is what we would intuitively describe as the definition of the concept, the extensional is a list of all members of the concept. We have assumed that negligence, assumption, contract, etc are infinite legal concepts. The intensional form is the statement of law that follows the legal predicate in judicial opinions (we have quoted examples from Donoghue and Hedley Byrne earlier in this thesis). The extensional definition is the list of cases in which those concepts obtain.