# Language, Logic and Legal Science
## Are We Lagging Behind?

## PART I - INTRODUCTION

### The need for a new look at the notion of legal science

Legal theory is inevitably affected, for good or ill, by prevailing philosophies. This is especially the case when philosophical notions derive from changes in scientific method, for lawyers have always been fascinated by the notion that the study of law should and could be a scientific enterprise. The deductive models of science, fired by remarkable advances in mathematics, were introduced into the law by the jurisconsults of ancient Rome and in due course transmitted to both European Civil Law and the Common Law of England. The success of the physical sciences in the eighteenth and nineteenth centuries, especially those based on observation and experiment, provided an impetus for empiricist philosophies which were likewise put to work in legal theory, with the help of John Austin, in the late nineteenth and early twentieth centuries. Progress in the social sciences in the early twentieth century again impacted on Jurisprudence in the Legal Realist movement.  These are the major themes: but legal change on a smaller scale occurs with every advance in scientific method which finds its way into a persuasive philosophy.

Traces of these movements can still be found in legal theory and even in legal practice but they are more like persisting remnants than live forces. We seem to be drifting along, jurisprudentially speaking, without much in the way of either direction or impetus, like a ship becalmed and lost in uncharted waters. The crew, as is to be expected in such situations, bicker and squabble about what directions we should take with some proclaiming that there is nothing to be done since the situation is hopeless.

Yet help is ready at hand and skepticism is unwarranted. What are arguably the two most significant events in the last half century, so far as philosophy and scientific method are concerned, hold great promise for legal theory. These are:

(1)  The advent of language/logic philosophies especially those deriving from the work of Ludwig Wittgenstein

(2)  The computer revolution and the development of computer logics.

These things are not new. They have been around for decades and are familiar, and indeed old hat, in the worlds of philosophy, science and business. Yet they have made little or no impact in law. One can find an occasional branching diagram in a textbook or law review article but they do not have the place or importance that is ascribed to them elsewhere. There are probably

several reasons for this unfortunate fact, but a major one must be that there is no real appreciation among lawyers of the philosophical ideas that underlie these great events or their implications for the theory and practice of law.[1] This in turn relates to the continuing isolation of developing professions and institutions. We become progressively unaware of what others are doing, so that unresolved problems lie here and possible solutions there but they never meet.

It is the purpose of this article to see how currently available logical tools might be put to good use in legal theory and practice. In order to do this it is proposed :

(1) To review the development of the new notions about logical form

(2) To outline the development of linguistic logics and

(3) To consider the applications of these things to the theory and practice of law and finally

(4) To outline a feasible and useful version of legal science.

## PART II   CLASSICAL LOGIC AND MODERN FORMALISM

### Logic in the old style – deductive and inductive approaches

The term logic, in its formal sense, is still commonly taken to refer to the logic of the syllogism; and modern introductory books on logic continue to be built round the notions of Aristotle with perhaps a little introduction to symbolic logic and a section on so-called inductive logic.[2] It is generally admitted by both teachers and students of these courses that they do not improve the reasoning ability of the student and, indeed, it is difficult to imagine what other practical uses they might have.

Two types of books purporting to instruct lawyers in logic continue to be published. One variety peddles basic syllogistic logic with some suggestion as to how it may apply to legal reasoning. The other adopts a sort of inductive method

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[1] It is not being suggested here that the legal profession has not made use of contemporarily available computer resources.  It is the logical principle underlying the computer that has not been understood or incorporated into legal theory. Vast databases with sophisticated search engines and processing devices have already been created for legal purposes (including prediction), and the end is not yet.  But even sophisticated processing is fundamentally different from thinking in the philosophical sense; the latter is beyond the capabilities of even the most sophisticated of computer programs. The computer is irredeemably left brained: true reflective thinking requires imagination and creativity

[2] The term inductive logic was coined by John Stuart Mill to cover the formal methods of producing general propositions from factual information. It has been rendered largely irrelevant by the development of modern formal logics where systems are applied to facts rather than extracted from them.

and studies the reasoning processes of real judges found in judicial opinions. It is submitted that both of these approaches miss the mark. The syllogism is seldom if ever used in real life arguments, including legal reasoning. The notion that courts begin with general principles and derive progressively particular propositions from them by deduction until they reach the case before them, never really worked in practice and can currently be considered dead. Some authors have suggested that bringing the facts of a case under a rule of law is a syllogistic argument since particulars are thereby subsumed under a general rule. But this is not so. The syllogism is based on a necessary connection between the premises and the conclusion: if you accept the former, the latter follows. This is not what happens when a legal term is applied to a case.

The second approach, extracting legal reasoning from judicial opinions[3] is likewise misplaced effort. The problem here is that judges do not create logical forms, but take and apply anything that is available to them. They are users, not programmers. Their reasoning tools are commonly those forms already present in the law which they have inherited, or (rarely) that they have imported from other source.

These approaches, both deductive and inductive, are inadequate in the sense that they appear to be out of step with what is happening in formal studies both in philosophy and in the practical world.  This is particularly unfortunate as there is a great deal of formal material available which is just begging to be put to use in the law. A brief account of the modern development of formalism should make this clear.

### The development of modern formal studies – game theory

The various kinds of mathematics were treated by Plato and Aristotle as separate and distinct entities, though not necessarily unrelated, and these were in turn thought to be different from formal logic.[4] The multiple category view of mathematics and logic persisted through the middle ages and has survived here and there into modern times. But Descartes in the seventeenth century had shown that that geometrical shapes could be described by algebraic formulae.[5] And it was demonstrated in the early nineteenth century that the same held true for formal

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[3] Julius Stone appears to me to take this approach. See his PROVINCE AND FUNCTION OF LAW, NY 1973

[4] The big question was how, and in what sense, the valid conclusions of these subjects were "true". Medieval philosophers were divided into two main parties, the realists maintaining that the symbols of mathematics represented real entities somewhere (the heavenly forms) and the nominalists who said that they existed only as general terms (names) with nothing real actually corresponding to them

[5] In his development of coordinate geometry. Any point in a line has X and Y coordinates so that shapes, made up of such points connected together, can be described by algebraic equations. The equation for a straight line at $45^0$ to the base would be x = y. Descartes derived formulae for common shapes such as a triangle, a circle and a rectangle. He concluded that irregular shapes, whether two dimensional or three dimensional, could be represented by combinations of simpler more regular ones.

logic.[6]   Finally, nineteenth century mathematicians, especially Gottlob Frege[7], linked all forms of mathematics together in what has come to be described as game theory.

All formal systems can be viewed as games, like chess, with pieces (pawns, kings, queens, knights, bishops and castles) together with the proper moves and their consequences which represent the rules of the game. Arithmetic, algebra, geometry and logic are thus seen as games, with numbers, letters and shapes considered to be playing pieces while the various valid transformations that can be effected are the moves of the game.[8] These games can be pure or applied. Pure games are just that, pastimes; but they can be applied to organize any set of materials, either for scientific or practical purposes.

### The development of modern formal studies – Ludwig Wittgenstein

It would be difficult to overestimate the importance of Ludwig Wittgenstein's[9] contributions to formalism. He perceived that the game theory of mathematics applied equally well to a number of other things including ordinary language. Obviously the rules of grammar apply to language, but this was not important for Wittgenstein; who called this *surface logic*. He was more interested in other word games, embedded in ordinary language, that are used for all kinds of purposes, including argument. Wittgenstein's first essays into this area focused on forms of language that imply the existence of something. His studies here led to the doctrine of verifiability according to which the meaning of any term consists of the steps and procedures that one might take to show whether the item indicated by the term existed or not. The initial product of this early work was a set of radical notions about the meaning of words, which came to be known as logical positivism.[10] According to this theory, propositions that could not pass the verifiability test were to be regarded as not merely doubtful or false, but meaningless; they were just sounds signifying nothing.[11] After initial enthusiasm, there was a general withdrawal from the stern logical positivist doctrines, with A.J. Ayer himself, its first publicist,

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[6] George Boole, Professor in the University of Cork, Ireland in the first part of the nineteenth century, represented formal logic in both arithmetical and algebraic forms.

[7] Professor at the University of Jena (born 1828-died 1905) who was primarily interested in the relationship between logic and mathematics.

[8] My colleague Richard Bowser has a most effective and illuminating introduction to formalism using the rules, present and potential, of baseball.

[9] Ludwig Wittgenstein (1889-1951) an Austrian engineer who transferred to Manchester University's famous school of engineering where he became interested in the theory of mathematics which led him to Cambridge where he began to study philosophy.

[10] Popularized in A.J. Ayer's book LANGUAGE TRUTH AND LOGIC. Victor Gollantz, London 1936

[11] The main logical positivist tenets were that any term which could not be tested by a verification procedure was not merely false but meaningless. Moral statements were fitted into this form by considering them as emotive statements or statements about personal preferences. The great problems of traditional philosophy were considered to derive from misunderstandings of language and were therefore styled "pseudo-problems".

leading the retreat.[12] This, of course, was not the end of linguistic logic.[13] The investigation of philosophical problems from the perspective of the logic of language is still very much alive.

The early logical positivism has been largely replaced a number of different versions of linguistic logic.[14] The most significant of these, especially from the perspective of legal theory, can be found in Wittgenstein's own later modifications of his original ideas.[15]  In his later lectures and conversations with friends, he still maintained that the logical use of words should be viewed as the application of language games, but had come to regard function and context as vital notions in understanding their meaning.[16]  A different purpose creates a different meaning for the same word or sentence. One of Wittgenstein's most quoted statements is that a lever is a rod used for a different purpose.[17]  He notes that even a different inflection on a word may change the meaning and show that it is intended as a command or to voice a question  to deny something or even to make a joke. This necessary connection between meaning and function is very important for legal theory. It makes it clear that statements, including statutory clauses, are not meaningful until we know their context and the ends that they are intended to promote. There can be no rules without background and purposes to give them meaning.[18]

Putting together what Wittgenstein is saying about logical forms; there are obviously three tasks to be performed when applying any logical game.

The system must be properly set up; the individual "pieces" must be clearly defined along with a consistent set of rules for the transformations (moves) that will be permitted.

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[12] See The Philosophy of AJ Ayer Vol XX! In The Library of Living Philosophers. 1992.  Southern Illinois University. Ayer later conceded that many philosophical problems were real problems not merely due to confusions about the logical use of language.

[13] The notion that many philosophical questions are pseudo-problems created by misuse of language is still a major investigational tool of language/logic philosophers.

[14] Perhaps the best known of these was "ordinary language philosophy" which considered the notions buried in common speech as the materials which philosophy could use to answer questions and especially to resolve conceptual puzzles. The underlying principle is that ordinary language contains a sort of wisdom derived from common experience. A. J. Ayer was extremely critical of this movement and with some reason. It could have been used at one time to show that the earth was flat.

[15] His later thinking is largely reconstructed from lecture notes made by his pupils (published as the green and brown books) and from conversations with friends, some of whom made shorthand notes of the discussion. See THE BLUE AND BROWN BOOKS. Harper 1986; PHILOSOPHICAL INVESTIGATIONS,3$^{rd}$ edn. ed Anscombe GEM. 1999. The investigations are also available, free, on the internet.

[16] He felt that his earlier work in the Tractatus had focused too much on the indicative mood (factual statements) and on the logical use of nouns.

[17] See Philosophical Investigations Aphorism 10, where he discusses the rod being incorporated in the brake system of a railway engine and thus becoming a lever.

[18] Commonly expressed as the maxim "no rules without reasons".

The things or the enterprise to which the system is being applied must be clearly identified. A change in application will usually require changes in the game.

The purposes or goals of the enterprise (application) must be identified and thereafter kept in mind when the calculus is being applied.

These three interrelated matters can be formally illustrated in the following diagram.

**THE FORMAL CALCULUS (GAME)**
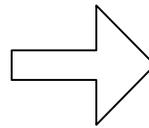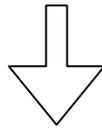
⬇                    ⮕     **THE PURPOSES**

**THE APPLICATION**

If the three essential components are not present, the application will not work well, if at all. And each of these elements must be set up properly and used correctly. So if there is inconsistency within the system, ambiguity as to the applications, or if the goals sought are indeterminate, confusion will result.

### Pure and applied formal systems

Formal systems, as was mentioned earlier, may be either *pure*, i.e. they are just games with no other purpose, or they can be *applied*. Mathematical and other logical games[19] are commonly applied to real affairs for various purposes. Indeed, a formal system of one sort or another can usually be found or devised to represent and organize any materials that are not assembled in a totally random manner. Thus geometry was applied in ancient Egypt to resurvey the Nile delta every year when the floods had wiped out all the old landmarks: Copernicus and Galileo applied a somewhat more complex geometrical system to explain the movements of the heavenly bodies and cannon balls in flight: and an obscure physician devised statistics to standardize the preparations of foxglove tea that he used to treat patients with dropsy. An infinite variety of mathematical games can be devised. The older arithmetics used sets of ten units, presumably because we have ten fingers, but there is no reason in the world why we shouldn't use any number we please.[20] Binary arithmetic uses only two units, 1

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[19] These are commonly called calculus systems, especially by German authors. The term calculus unfortunately tends to be confused by students with the differential calculus of Newton and Leibniz.

[20] The mathematical quantity     is used as the unit in some mathematical systems designed for use in biological studies.

and 0, which allow it to be used as the basis of computer logic, since the ultimate component of a computer is a switch that has to be either "on" or "off". Currently, research mathematicians do the most amazing things with already established mathematical systems.[21] They also tend to work with picture symbols (icons) rather than numbers or letters since they claim that mathematical processes have become too complicated to be represented as simple quantities or equations. It is hardly surprising then that many of the computer games that children play with are spin-offs from pure mathematical research. Much of our thinking is likewise carried out using visual symbols, icons or picture logics.[22] The ball and stick images used to represent the chemical components of molecules in chemical theory are a familiar form of iconic logic. There can even be a logical use of stories.[23]

# PART III.  APPLICATIONS OF MODERN FORMALISM TO LAW

## The application of formalism to Jurisprudence – forms currently in use

Wittgenstein's descriptions of language games apply very easily and naturally to law. In fact lawyers have been using language games for millennia. The Roman Law formulary and the Common Law writ deriving from it,[24] not only carried a general notion as to what kind of action at law was being initiated but also the elements which had to be shown in order to succeed. This feature, associating elements with forms of action, has persisted even though the writs and forms of action associated with them have been officially abolished.[25] The elements game, the relict of this procedural system, can be illustrated in virtually every part of the law, with the elements identified as key items in a set of legal terms. The result is

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[21] High echelon mathematicians are hired by the Department of Defense and by medical insurance interests to find better ways of evaluating defense spending and payments for medical services. The ways in which these experts tweak conventional statistical methods to get better results is, to say the least, remarkable.

[22] Wittgenstein's oft quoted statement that 'the limits of my language are the limits of my mind" appears to have overlooked the possibility of thinking with visual symbols.

[23] James Montgomery Boyce, a decidedly conservative theologian, uses this rather novel notion to interpret the stories in the early chapters of the Book of Genesis, such as the tower of Babel and the serpent in the Garden of Eden. Story logics may also be considered an appropriate form for historical research.

[24] Sir William Maitland's view that the Common Law owed little to Roman Law is well known and, generally speaking, justified. The two parted company and were each making their own way. But Roman Law influence was strong in the early period up to the time of Bracton; and many continental doctrines and institutions entered the Common Law at that time. The Royal justiciars who established the foundations of the Common Law were higher clerics with considerable knowledge of Canon Law and/or Roman Law. Maitland recognized this commenting on the formulary system that it is distinctively English  but also in a certain sense, very Roman. See Pollock & Maitland, HISTORY OF ENGLISH LAW, vol ii. p 558.

[25] Maitland's comment is apt here that "The forms of action we have buried, but they still rule us from their graves." THE FORMS OF ACTION AT COMMON LAW (1909) p.1

sometimes called the "AND" game [26] since all of the items mentioned in the definition must be shown to be present before the action can succeed. The four elements of the action on the case in negligence are well known illustrations of game theory, but it could be matched in almost every part of the law. Another traditional game is where a showing of all the possible elements is not required but at least one must be proved. This is similar to the use of the term "or" in the disjunctive syllogism and indeed this kind of form is sometimes called the "OR" game. The law of damages is an obvious example where at least one form of damage must be shown in order to succeed.[27]

Setting this out formally, the "AND" and "OR" games are arranged in the form:

**A + B + C = X** (the activating term in the "AND" game) &

**A or B or C = X** (the activating term in the "OR" game)

Virtually any functioning part of the law can be analyzed in this manner. The basic elements of offer and acceptance together constitute a bargain and this, together with consideration (or something else deemed to show legal intent), constitutes a legally enforceable contract. Procedural law and remedies can be represented in the same way.

Another simple language/logic maneuver is involved in explaining the meaning of legal terms by showing how they apply to paradigmatic cases. Thus a typical positive illustration may be given, where the term clearly applies, followed by a clearly negative example and then perhaps some borderline cases will be mentioned. This was a standard technique in medieval law books, for example Bacon's REGULA, and is still used in modern horn books. It is reminiscent of what Wittgenstein calls the "ostensive learning" of language; where the term is mentioned while a finger is being pointed at a thing. For example several blue objects may be pointed out to the pupil as the word is spoken, to teach the meaning of the term "blue".[28] This too can be formally represented by what have been described by students as "the circles of Aristotle", representing the notions of "All", "None" and "Some".



**All B is A**          **No B is A**          **Some B is A**
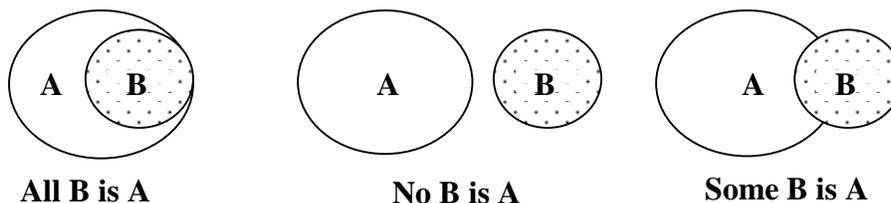
[26] Roy Stone (The Compleat Wrangler, 50 Minnesota Law Review 1001 (1966) cites Russell and Whitehead as saying that all mathematics boils down to two key terms "and" representing conjunction and "or" representing dissociation.

[27] This is of course the "weak" form of disjunction: at least one of the alternatives must be true but there can be more than one. In the "strong" form of disjunction, only one of the alternatives may be true.

[28] Philosophical Investigations. Op.Cit, Aphorism 6

In the legal context, this kind of form can be used to indicate that a given fact pattern is clearly within the meaning of a legal term, clearly outside it, or that it is a borderline case which must be decided by some other means. Commonly such doubtful cases are decided either by resemblance to precedent cases or by reference to the tendency of the decision to further the acknowledged policies of that piece of legal apparatus.

## Other available formal devices –the algorithm

There are a number of simple formal tools that are currently much used in other professions, but have somehow failed to attract much attention on the part of legal scholars. Perhaps the most common of these is the branching logic device of the algorithm. The is the basic arrangement of computer logic based on binary arithmetic with the numbers 0 and 1 representing that a "switch" is either off or on.[29] The algorithm is used a great deal in medical writing where it can represent all sorts of things such as the steps in a diagnostic process, starting perhaps with a rash and ending with the most likely disorders which might be causing it.

The algorithm has much to commend it for use in legal writing.[30]

First, it is an excellent discipline to be able to organize materials in this formal way. One is more apt to see confusions and omissions in the diagram than when they are buried in the written text.

An existing diagram can act as a check list of items that should be considered when reviewing an area of organized knowledge with a view to applying it for some purpose or other.[31]

It is an efficient way to communicate the results of any study to other researchers or professionals. Readers can pick up a total overview of the findings more quickly and more accurately than would be the case with a narrative report. They can also more easily see whether and where they may disagree with the writer. They may even indicate the nature of their

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[29] Binary mathematics would appear to allow only two alternatives at each step, but this is not the case. Combinations of 0 and 1 can be used so that any number of possibilities can be represented at each dividing point in the process.

[30] The algorithm may even have been implicitly present in the medieval model of legal learning where a principle was illustrated by an instance and a particular case seen a coming under a principle. If the same principle is used several times in this way leading to different instances, the results, put together, would look very like a branching diagram.

[31] The differential diagnosis of the medical record is a good example here and computerized versions of this kind of thinking are increasingly being used in clinical medicine including psychiatry.

disagreement by making a change in or a comment on the diagram. [See Illustration #1]

Finally, it is a good way to indicate  proposed changes in the law. Two alternative diagrams can be compared to show the differences between an existing and a proposed system.  [See Illustration #2]

### Other available formal devices –decisional logics

Difficult decisions commonly require balancing or weighing of competing values or policies against one another. In medicine, the various factors to be considered in making a decision are often listed and these lists are used for all sorts of purposes. They can be used to select the most likely diagnosis; to decide whether to treat a condition medically or surgically; or to help in making the best choice of medications for a particular patient. Factor lists are also used in business, e.g., to help select the most appropriate short list of applicants for a particular job; or to decide at what point to buy or sell shares. Factor analysis is regularly used in legal texts, especially Restatements of the Law, at points where decisions must be made. John Austin would hardly agree with this since in his view giving someone discretion to make a choice was like giving them a blank check; there is nothing more to be said and no possible objection that can be made once the choice is made. [32] One can see why Austin, from the perspective of laws as commands, adopted this unfettered view of discretion. One can also see why Ronald Dworkin and others have rejected it, and their arguments seem sound. Decisions are not often made in a vacuum with absolute unlimited license to do what one pleases: in most cases there is an expectation that the person given the power to decide will exert themselves to make a good decision, or at least the best choice that seems open to them at the time. And the appropriateness or otherwise of the decision can be measured against the known objectives of the choice. Legal authors therefore, in situations where choices must be made, commonly list a number of factors to be taken into consideration. These can be used in deciding, for example, whether the smelly factory should be moved elsewhere; or its owners made to compensate the surrounding home owners for reducing the value of their property ; or to pay the costs of moving them away from the nuisance. In like manner, Professor Aaron Twerski has listed ten factors to be considered in deciding whether or not to submit a design defect question to a jury.[33] Unfortunately, in legal texts, the factors are not likely to be helpful since they are simply listed without any instructions as to how they should be used. The medical profession and the business community go beyond this, providing ways of putting the factors together to create a decision-making apparatus. There are two basic ways of doing this.

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[32] Austin is not saying that factors do not enter into a decision, or denying that some decisions are better made than others. He is simply saying if a valid discretionary power is used, it is not the business of Jurisprudence to say that it could have been used better. This position is, of course, open to the same objections as his view of judicial legislation.

[33] Professor Twerski included this list in an earlier edition of the Henderson  & Twerski products liability case book as a possible solution to the problem of "design by jury". It was omitted in later editions for reasons unknown.

(1) They can be divided into major and minor factors with a formula provided to put them together in a decisional apparatus. These are known as *weighted factor systems* since the major factors weigh more heavily in the decision making process. This method is used in the DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS (currently DSM-IV), to help decide which is the most appropriate diagnostic category for a particular set of symptoms. The diagnostic formula for dementia of the Alzheimer's type (DAT) makes the finding of recent memory impairment the one essential major factor. The diagnosis of DAT is then confirmed by the presence of one or more of four minor factors.[34]

(2) The factors can be roughly quantified by assigning number values to each of them and adding the resulting numbers together to obtain a total sum. These are called *scored factor systems*. A simple way of doing this is to assign the numbers 0, +1, or +2 to each factor depending on whether they are definitely absent (0), doubtfully present (+1), or clearly present (+2). The numbers assigned to each factor are then summed to provide a total score that can be used to assist decision making. Scored factor systems are frequently used in clinical medicine and in business. They are not normally considered capable of making decisions without human input; they only assist in the deciding process, generally confirming the intuitive perceptions of the user or perhaps focusing attention on the best options. More sophisticated scoring systems can identify the best options even more clearly.[35]

**The use of formalism in clearing up tangled jurisprudential differences**

Complicated jurisprudential arguments could in most cases be clarified and in many cases resolved by formal representation of the opposing points of view. The modern debate between the advocates of descriptive jurisprudence and their critics is a good example. It is a very complex matter where it is easy for the opposing sides to misunderstand and misrepresent one another. It takes its origin from different interpretations of Austin's famous dictum that "the law is one thing, its goodness or badness is another". This apparently clear statement, however, is capable of a number of interpretations. It has been taken to mean that positive law is a set of commands with no values attached to them. This view of law, that there could be rules without values is, from a language/logic perspective, an impossibility: and it is very doubtful that Austin intended any such thing. Strictly construed, he is only saying that values are not to be used, at least in Jurisprudence, to criticize or attempt to improve the law. More perceptive critics therefore complain that while Austin may acknowledge that values are

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[34] DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS 4th edn. American Psychiatric Association, 1994. p.142. The DSM system is, of course, a great deal more sophisticated than this simple item would suggest.

[35] Early medical diagnostic software was notoriously inaccurate but current systems are achieving sophistication to the point that it may be considered malpractice not to consult them. Similarly early chess software has been replaced by programs such as Big Blue which can defeat world champions. Computer diagnostics for automobiles have also become very sophisticated.

needed for law to function well, he has removed them from the description of the law itself into the realm of legislation. They are not embedded in the structure of the law, and therefore outside the business of Jurisprudence.[36] This argument might carry against Austin, but his modern supporters have modified his views. They are willing to concede that moral and policy notions are indeed part of the substance of the law, but assert that they are factual rather than value statements. In descriptive jurisprudence, we are told, values are like the other constituent parts of the legal apparatus; they do not need to be justified. It is not implied that anyone ought to feel any obligation to follow them in practice. A legal writer may note, for example, that the following (named) values[37] are in fact present in the law of private nuisance and are used to apply the law to cases; but it is not thereby implied that the author personally accepts these values or is recommending them to anyone as true or valid.[38]

This view significantly deviates from the traditional view of lawyers about the moral values of the law and has not surprisingly drawn criticism from several quarters. As Neil McCormick has pointed out[39], it takes an external as opposed to an internal view of moral notions in the law and it does seem odd. It might be appropriate in interpreting law to non-human visitors from a distant planet, but seems odd when dealing with people, lawyers and lay persons alike, who tend to have, and generally require, an internal view of legal values.[40] This is particularly the case with judges and advocates who are expected to do more than describe the law; they must also, at all times, recommend its observance and, on appropriate occasions, seek to improve it. And this is not only in their political capacity as citizens but, more importantly, as the custodians of the law.[41]

This debate is clearly very complex and is just asking for formal clarification. [See Appendix] The various parties have made numerous and valuable points in the course of their arguments, but neither makes it really clear how value propositions function in the legal apparatus. Dworkin has provided examples of cases where the court refused to go along with well established existing law because it seemed morally wrong; but when and how this drastic step is to be considered is not explained. Hart on the other hand acknowledges

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[36] This is the gist of Ronald Dworkin's major criticism of legal positivism. Dworkin's argument is that moral values are used by courts to decide cases even, in some cases, when the rules of the jurisdictions seem contrary to them. See TAKING RIGHTS SERIOUSLY, Harvard UP 1977, p. 23

[37] The paired values here are that ownership gives the right to use, enjoy and even destroy ones property (uti, fruere et destruere) but not so as to interfere with the same rights on the part of ones neighbor (sic utere tuo ut alienum non laedas").

[38] Hart terms this approach descriptive as opposed to evaluative jurisprudence. Op cit. p239 ff.

[39] LEGAL REASONING AND LEGAL THEORY (1978), pp.63-64,139-40

[40] Further discussion of this question requires consideration of the doctrine of Natural Law which I have discussed elsewhere and especially in Bowser R & McQuade JS, *Marketing Natural Law*. Campbell Law Review Fall 2004  p

[41] Savigny FC.  See THE VOCATION OF OUR AGE FOR JURISPRUDENCE AND LEGISLATION. Reprint London (2000) p 145 ff where the author describes the legal profession as a collective (collegium) entrusted with both with the scientific organization and the improvement of the law.

that value propositions are part of the law, but is equally unhelpful as to their place in the legal apparatus.

The formal tripartite model provided by Wittgenstein and illustrated earlier, seems to supply these deficiencies and clear up this set of problems. Law can be viewed from this perspective, according to the diagram shown previously, as (1) an apparatus of legal terms (2) which can be applied to disputes or potential disputes (3) in order to achieve certain ends.

The primary locus for values is clearly in the third part. [42] The values of the law, whether moral principles or policies of one sort or other, are the objectives to be achieved in each application of the law. In the (rare) easy cases there is only one value or all the relevant goals may be substantially met without having to sacrifice one to the others. In such cases, values will probably not be mentioned in the opinion, and it might seem that they are not required: but they are always present by implication. [43] If there is more than one relevant value, as is commonly the case, and if they conflict with one another, as they often do, then values will normally be noted and some balance must be struck between them.[44]

In difficult cases, some or all of the relevant values may have to be compromised. In very hard cases there may seem to be no good way out and we must do the best that we can. Plato describes justice as a harmony, like the tuning of a lyre with each string at its proper length. Perfect justice is when all the values are fully realized.[45] In the real world, of course, next-best solutions are usual.[46]

Values then guide the application of the law. They may also be used to critique legislation or judicial decisions, considering whether they further the professed objectives of that part of the law or not.. But clearly, both as guide posts and measuring rods, they are part of the logical apparatus of the law, essential both to its administration and its improvement.

## PART IV   THE NOTION OF SCIENCE AND OF LEGAL SCIENCE

## A.  VARIATIONS IN THE MEANING OF THE TERM SCIENCE

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[42]  It might appear that values may also be found in the actual apparatus of the law in the form of decisional games, but the factors used here are not values but rather factual considerations which point in the direction of certain values.

[43] This implied presence of values in simple cases is not taken into account by Roy Stone, who opines that values are only important in establishing a legal rule, but thereafter can be ignored. See *The Compleat Wrangler*, 50 Minnesota  LR 1001 (1966)

[44] Probably what Dworkin intends when he says that principles, unlike rules, must be weighed.

[45] Republic Bk IV where temperance and justice are described as being harmonies, a condition where the different elements in the state and in the individual maintain their proper place.

[46] E.L Allen, a well known philosophical writer of a previous generation, in a series of lectures on Ethics, delivered in Belfast in 1952,  commenting on the statement that politics is the art of the second best, opined that in practical politics one may be very happy to get the eleventh best.

## Changing models of scientific method

The term science implies knowledge as opposed to mere opinion and, like the medieval term *ratio* it can be used to indicate a systematic way of studying something or, derivatively, an organized body of knowledge that is the product of systematic study.[47]  But both method and product have been viewed rather differently in different ages. This is due to the fact that when a particular kind of science is seen as being very successful or promising at any particular time, it tends to be taken as a model to which all scientific enterprises should conform. Broadly speaking there have been three major models of scientific method, each of which supported quite different views as to whether any particular branch of learning was or was not scientific. These are the geometrical model,[48] the empirical model and the game- theory (computer) model. These perceptions of scientific method have persisted, in many cases beyond their usefulness, into modern thinking. It may therefore be worth while do describe them briefly , hopefully avoiding the accusation of teaching grandmother how to suck eggs.

## Science as deduction

The geometrical model, favored by Plato for its certainty, was dominant in the middle ages and focused attention on the formal branches of learning such as geometry and logic. Observation was considered to be inferior to logical thinking in its ability to reach truth: you do not study the properties of a triangle by looking at actual triangles but by thinking about the concept of a triangle and making deductions from it. The empirical sciences, if they were thought possible at all, were treated as second class citizens. The only known kind of study of physical things, where anything remotely like mathematics seemed to apply, was astronomy, since the paths of the heavenly bodies could be regarded as geometrical patterns, though imperfect ones. The unreliability of observational science was attributed to the fact that on earth the intellectual things (which alone could be certainly known) were mixed up with matter which was obviously unintellectual or even anti-intellectual. The heavenly bodies, high above the earth, were thought to be less material, so that their intellectual content was more prominent. This view was sometimes expressed in the dictum that there could be no science concerning anything that was nearer to the earth than the moon. The geometrical model has been largely absorbed into the mathematical view of science and can hardly be recommended in its original form. It can however be quite easily restated in language/logic terms as will appear later.

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[47] The term ratio was used by the scholastics as a general term to include the faculty of reason, and the process of reasoning. It would seem that among medieval lawyers it was taken to mean the product of reasoning, an organized body of learning. See McQuade JS, *Medieval ratio and modern formal studies*. 38 American Journal of Jurisprudence (1993) 359

[48] The mathematical model will be included under this heading, which was the view of  the early mathematical scientists such as Galileo and Newton.  Other versions of the mathematical model may also be classified as particular forms of game theory.

## Mathematical science

The possibility of sublunar science was considered by some great medieval thinkers, notably Robert Grosseteste,[49] who expanded Aristotle's logic to include such things.[50] Grosseteste's work was taken up in Italy and the first steps made towards a scientific knowledge of material things with Galileo's mechanics. Galileo, and those who followed him, showed that mathematical formulae could be used to represent physical events and it came to be felt that this was science "properly so called"..[51] Descartes, reflecting on Galileo's work, divided "things" into mental and material things. Material things boil down, he said, have two essential properties, namely extension (dimension) and movement. Both of these can be represented by numbers or algebraic formulae and so are proper objects of scientific study. Mental things cannot be measured and so, Descartes concluded, cannot be studied scientifically.

A number of philosophers following Descartes agreed with his views regarding physical objects but did not accept that there could be no mental science: and the advent of statistical mathematics was to prove them right. The social sciences, after a slow start, progressed rapidly in the earlier part of the twentieth century and powerfully affected legal theory. The methods and findings of social science had a central place in the thinking of the American Legal Realists. Even those who, like Pound, believed that jurisprudence was not a positive science, were well aware that the work of social scientists could be extremely relevant to lawyers and to legal theory.

## The radical empiricist view of science – scientific positivism

The spectacular success of the science of "things" during the nineteenth and early twentieth centuries led to an emphasis on observation and the revival of strict empiricism, the notion that knowledge is based on facts; and facts are what we perceive by our senses. The previous situation, where information obtained by the senses was despised, was now reversed and information from any other quarter was considered inferior. The most reliable empirical evidence was the repeatable experiment. This would have test-retest reliability, uniformly producing the same results. It would also be expected to have inter-rater reliability, with uniform results regardless of who conducted the experiment. The term "science" was thus restricted to the most exact of the physical sciences. Researchers here practiced science properly so called; others such as social scientists or historians, might be described as scientists but only, as Austin might say, by analogy.

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[49] Bishop of Lincoln in the first part of the13th century.
[50] See McEvoy J, THE PHILOSOPHY OF ROBERT GROSSETESTE, Oxford 1982, p.206 ff.
[51] This mathematical approach to science has persisted into modern times Medical pundits were accustomed to express this point of view, emphatically if ungrammatically, by saying that if you don't got numbers you don't got nothin'.

Radical empiricism, however laudable as a method in certain of the hard sciences,[52] was a rather naive philosophy of knowledge; and all sorts of problems became apparent as philosophers began to think seriously about it. David Hume's ultimate conclusions on this matter can be summarized by saying that if we only know what we perceive, we do not know very much. The existence of things external to our minds, of minds other than our own and even our own existence as persons (other than the sights and sounds that we are hearing or seeing or remembering at a particular moment in time) are very doubtful propositions indeed on empiricist principles.[53] More importantly, creative thinkers do not operate this way either as scientists or in any other form of study. It is true that armchair speculations without observations are not likely to take one very far, but it is also true that fruitful scientific research is unlikely to be carried out with any degree of success by people who are afraid of speculating.

Radical empiricism therefore had to make way for theories which would bring together the rational and the observational aspects of science, and these became more persuasive in the present century with the dissemination of more adequate accounts of the nature of mathematics and especially with the development of game theory.

### Science as the application of symbolic games to problems

Contemporary models of science treat scientific knowledge as applied calculus, where sets of symbols of all kinds are used to represent and explain phenomena. These may be algebraic formulae, or icons or specially defined words (or letter abbreviations for words) put together in a system.[54] This approach sees science of every kind as the application of formal systems to data. Like all methodological prescriptions it should not be taken to apply everywhere in exactly the same way for all purposes. The general notion of applied game theory will take different forms in different disciplines. The methods that are suitable for experimental chemistry will not be apt for observational sciences such as astronomy. Each discipline must then find or develop its own calculus systems; design protocols to govern the application; and indicate the ends or goals that it seeks to achieve. This is clearly the case for the physical sciences, but holds good in other areas also. The study of history is certainly not ordinarily experimental[55] but explanations, often in the form of descriptive narratives, are

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[52] This was Herman Oliphant's comment, avoiding the philosophical problems of radical empiricism, but still wishing to stick close to the facts with little in the way of theory. Whether one can take advantage of a defective theory by classifying it as a method seems doubtful. See Oliphant H, *A return to stare decisis*. 14 American Bar Association Journal (1928) p.71

[53] See his chapter on *Skepticism with regard to the senses*, A TREATISE ON HUMAN NATURE , Bk.I, Mentor Books N.Y. (1962 ) p.288.

[54] Chemical reactions, for example, can be represented by any or all of these kinds of symbols.

[55] Experiments, such as the voyage of the Kon-Tiki across the pacific, may be undertaken to show that a historical theory was physically possible.

applied to known facts to achieve credibility.[56] Ethics too may be undertaken as the organization of a set of consistent perceptions as to whether things are right or wrong (or good and bad).[57] Provided the entity, for which an application is being attempted, has regularity of some sort or other, appropriate calculus may be found or developed, and applied to achieve whatever goals may seem appropriate.

Applying these considerations to the study of law generally, it can be seen that virtually any kind of enquiry that a thoughtful lawyer might undertake, could and should be undertaken scientifically.[58] But it is being argued here that the backbone of legal studies, the organization of statutory, regulatory and case materials into consistent systems of law, is essentially the development of calculus systems for legal purposes and that Jurisprudence, in that sense, is indeed a science in the strictest sense of the word. It is not the less scientific because it cannot be managed like physical science any more than poetry is not art because it is not working with physical materials as in painting or sculpture.

Analytical jurisprudence clearly is or can be a scientific activity in the sense defined above. But this notion must be further explained and some additional questions answered before it can be accepted and put to use in the law.

## B. ANALYTICAL JURISPRUDENCE AS LEGAL SCIENCE

### Finding the "Province" of Jurisprudence - the "field theory" problem

The original term for scientific enquiry was philosophy, a blanket term that covered every type of enquiry into truth.[59] Plato indeed made this point [60] stating that the philosopher loves truth of all kinds. But, as knowledge accumulated, it became convenient, indeed necessary, to treat different topics or areas of knowledge separately and so the "field" theory was born. Natural philosophy, history and all sorts of particular kinds of study were thus designated as separate fields, which together presumably comprise "the estate" of academic knowledge. Universities came to mirror these divisions in their departments and sub-divisions within departments. Specialization in one or other of these subdivisions was inevitable and not long in coming. This allowed greater expertise to develop but also had the unfortunate result that each department, and sometimes individual

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[56] Historical research has been likened to assembling a jigsaw puzzle with some of the pieces missing. The objective is to see which arrangement makes the most plausible picture.

[57] Some have considered this a simple word game with only two terms, "good" and "bad"; but when excuses are taken into consideration, it can require quite a complex calculus system.

[58] Even determining the "facts" of a case is the application of historical method, seeing which story best describes the evidence.

[59] The term "wisdom" in the Proverbs of Solomon approaches this notion. Solomon's wisdom included speaking about trees, beasts, birds, reptiles and fish. Probably one should add the study of insects, given the references in the book of Proverbs to ants and bees.

[60] THE REPUBLIC Trans. Jowett. (474b-480a).

researchers within the same general area, became less aware of what the others were doing. Another consequence was that it came to be felt that, in order to be recognized as a scientist, or to have study of a certain kind recognized as being scientific, one had to show exclusive title to a piece of the estate. Thus, investigators in a particular area had to (or felt obliged to) show that their studies and investigations constituted a distinct scientific field and should be allotted a place in the map. This has been a persistent attitude among legal scholars. Austin entitled his work the *Province of Jurisprudence Determined* and spent a good deal of time distinguishing Jurisprudence from other studies such as ethics. Hans Kelsen likewise developed his *Pure Theory of Law*, distinguishing it from other approaches such as the sociology of law. The truth of the matter is that the boundaries between the "fields" are conventional only, and that they become progressively less important as investigations proceed. Special areas of study remain but there is nothing permanent or inevitable about them. They can divide up into further sub-groups or be absorbed into another one as convenience dictates. The process is analogous to a group of primitive, but philosophical, inhabitants investigating the wreckage of a strange flying object which has crashed and is scattered all over their island. The initial investigations will be local, studying bits and pieces which happen to be located together. As knowledge progresses, some of these, originally far apart, may be grouped together under the notion of wings, cabin, engines and so on. Still later it may be necessary to consider systems such as electrical wiring, navigation, propulsion, and communication. In short, the division of labor and classification of the problems will alter as the investigations proceed.

Applying these considerations to the study of law, there is no clearly distinguishable and completely separate field of study for jurisprudence. Every aspect of society and numerous academic studies impinge upon law and may need to be considered by legal scholars. The proposal here is that analytical jurisprudence is a valuable, perhaps even central, approach to the study of law, and that it is scientific in a meaningful sense of the word. But it is not the only possible form of legal science nor does it exist in a vacuum, totally separated from other kinds of social activity and other academic disciplines. The next great step forward in the understanding of law (and so affecting the arrangement of legal materials) may be lying unnoticed in the journal of some apparently unrelated subject or on the desk of some scholar (perhaps even a philosopher) who has no idea that it has any relevance to the study of law. Analysis will not function well sealed off in a glass bubble.

## Developing a formal methodology for Jurisprudence – renouncing the legacy of radical empiricism

Radical empiricism is the doctrine that theory is derived from and should remain close to facts with the very minimum of speculation. As applied to law this meant that rules (however defined) must somehow be extracted from the basic legal materials in the form of propositions of law. Strict empiricism applied to

case law meant that cases (the equivalent of the scientists' data) must be studied to extract from them the rule or rules that they contain; and if ones empiricism is really radical, these would have to be the narrowest possible rules that would explain the decision.[61] Bentham, very much an empiricist, favored such simple rules. Whether Austin intended to apply radical empiricism to the study of case law or anything else must be a matter for speculation. A good case can be made for the idea that he was attracted by Hume's view of science and especially his version of the central notion of causation. Austin's analysis of law into commands, with requests coupled by threats leading to a habit of obedience, has an attractive resemblance to Hume's associationism where constant conjunction of events leads to a habit of expecting one when we see the other. But if Austin was initially attracted by this idea, it is clear that he had serious questions on this subject.[62] The point is moot, however, for the enthusiasm for empiricist epistemology grew apace after his death and his works tended to be interpreted from that perspective. He was credited with the idea that legal theory could be extracted from legal materials much as theories were empirically "found" in physical data by physicists and chemists. Bentham's notion of the *infima species* was part of this intellectual environment, and so the search for the *ratio decidendi* of each case, as the narrowest proposition of law required to decide it, was on. Langdell is known to have greatly admired Austin and his case book method, finding the law in leading cases, is very much in this philosophical tradition.

Strict empiricist notions are no longer dominant or even favored among contemporary philosophers or scientific investigators. Imagination and creativity in thinking are encouraged and the formulation of bold hypotheses is seen as the most likely way to make progress. This is not the same thing as idle speculation. Hypotheses must be turned this way and that and checked in every detail for reliability. But what is being checked is not whether a proposed hypothesis is the narrowest and sole way of organizing the facts but rather whether it is the most reliable[63] fit; and it is especially important to show that there is no other notion which fares better. The narrowest construct is not necessarily the best.

In short it would seem that the theory is brought to the facts, not found in them. This is rather like the medieval view of legal theory, where the law was

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[61] The famous *infima species*.

[62] The works of Kant are well represented in his library according to the list of his books donated by his widow to the Inner Temple. Unfortunately the books themselves are lost, and along with them Austin's marginal notes, so that we cannot tell what he thought about Kant or how far Kantian notions may have affected his earlier enthusiasm for empiricism. It is true that his Benthamite background and associations might suggest that he had been, at least initially, in favor of strict empiricism. However, he abandoned or reinterpreted a number of Bentham's notions as his own thought developed, and he is quite likely to have changed his earlier opinions to the extent of having doubts about them if not so as to replace them with any others.

[63] Reliability here is a technical term and includes a number of things, including not only the ability of a construct to explain known facts but also its congruence with already existing established theories.

viewed as a logical structure which could be illustrated by the cases.[64] It has been argued that the term *ratio*, which can refer both to the faculty of reason and the process of reasoning, was also used by medieval lawyers to refer to an organized body of law, the product of systematic investigation. "The law says" and "reason says" could therefore be regarded as equivalent expressions.[65] This view of the law as system illustrated by cases persisted in the legal tradition long after the technical notion of "ratio" was forgotten. The governing council of the University of London, in establishing the study of law there, issued a statement expressing the hope, among other things, that the teacher of law there might learn "to illustrate his prelections – by practical discussion of cases actually tried in the Courts of London and Westminster – as the Medical teachers explain the practical applications of their science by Clinical Lessons.[66] This plan was taken by Rumford to anticipate the case book method introduced in the Harvard Law School by Langdell.[67] But this is not so. Langdell, an admirer of Austin and an advocate of legal science (modern style) was teaching his students to find the law in the cases. The governing council were rather restating the older view that the law is brought to the cases, not found in them. The cases show how the law has been applied, interpreted and even on occasion changed in the courts. But a case without a preexisting legal calculus being applied in the court, however crude that calculus may be, is a non-entity which may be thought to have existed at some time in pre-history but has never been encountered in fact. It is like the uninterpreted primary visual data of the empiricist philosophers, the ultimate colors and sounds and touches and tastes of experience. Such things almost certainly exist but there is no way that we can be aware of them as independently existing things. They come to us already identified as chairs, houses, barns and cows. Sights and smells and sounds may not always be identified, but in this form they are vague and hover on the margins of experience in a ghostly fashion until we can categorize them as sights, sounds, smells and sensations "of something". So legal materials come to us bearing the stamp of some already existing system of law. In order to understand legal decisions we must then identify the legal apparatus that was used to decide them.

The business of the legal profession is not then to find the law but to organize it formally; to develop the symbolic games, produce protocols for their application and provide appropriate ends and goals which the law may be expected to achieve. In these terms law can be defined as sets of calculus applied to disputes to produce that harmony of values which may be called

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[64] Lord Mansfield, stated that precedents are "evidences and examples of what the law is." See C.K. Allen LAW IN THE MAKING 7th ed. (Oxford 1963) p.217. This view represents the Civil Law attitude to precedent cases with which Lord Mansfield was very familiar.

[65] William Noy, writing in 1577, wrote "The Common Law is grounded on the rules of reason, and therefore we say in argument that reason wills that such a thing be done or that reason wills that such a thing shall not be done." Elsewhere he remarks that "reason says" and "the law says" amount to much the same thing. Noy W, MAXIMS OF THE ENGLISH LAW (1808 ed.) p.1

[66] Quoted by Belot, UNIVERSITY COLLEGE LONDON 1826-1926 (1929), p.47. Cited also by Rumford WE THE THOUGHT OF JOHN AUSTIN London (1985), p.29

[67] Rumford WE, Op. Cit. p.29

justice. And we may add, with Savigny, that it is also the business of the legal community to keep reviewing and improving these legal games to keep them in touch with changing circumstances and ideas.

## Analytical Jurisprudence as a normative science.

John Austin could not have lived in the intellectual environment of the first half of the nineteenth century without experiencing the enormous prestige associated with the developing natural sciences. And in the circle of advanced radical thinkers, among whom he was an esteemed member (at least in his earlier years) he must have felt the attractions of science based on factual information as a model for Jurisprudence. He also inherited a fact-based model of law from Thomas Hobbes. It would naturally have been a very appealing idea to Austin, as it was to many of the legal realists in the nineteenth century, to model legal science along these lines. There are indeed a number of indications, that Austin was tempted by, or may even have bought into the notion of jurisprudence as a quasi-physical science. In the main, however, his discussion remains in the mainstream of that legal tradition which holds that laws are norms, things ordered to be done, not existing things. They are enacted by the proper agencies with the idea that society will in fact conform to them; but this does not necessarily happen. Most modern interpreters of Austin have opted for a normative Jurisprudence. So when H.L.A. Hart speaks of descriptive jurisprudence, he is describing norms, not what actually happens in society.

## The nature of legal values– Natural Law theory

All parties seem to agree that moral values (including in that term policies) are essential parts of the structure of the law but there is considerable confusion as to their nature. Lawyers are traditionally uncomfortable with moral discussion and prefer either to get rid of it altogether (the law is the law) or have moral propositions so incontrovertible that there is nothing to discuss. Unfortunately such expedients are like the little Dutch boy plugging the hole in the dike with his finger; moral questions, like the North Sea, eventually pour in. If moral value cannot be excluded, the next option is to tame it, to make it more factual and suitable for open argument in court. The two most notable proposals of this nature which are currently favored in legal theory are Bentham's utilitarianism and, more recently, the social contract theory of John Rawls. Both of these have proved defective and for the same reason. You cannot build the humane values that the law requires on a non-moral foundation.[68] The only remaining viable candidate appears to be Natural Law theory, the notion that there are moral

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[68] Bentham's pleasure/pain has all sorts of difficulties but especially that it fails to guarantee good treatment of minorities and also does not provide a good reason why individuals should favor a benefit to society which is to their own disadvantage. Rawls' major difficulties arise from his acceptance of rational self interest as the deciding principle of each party to the agreement. it is impossible to get to the sort of humane values that he favors from this essentially self centered premiss. As one of his critics remarked, "you can't get there from here."

principles of right and wrong which are valid everywhere, in all ages and by everyone (*ubique, ibique et ab omnibus*). There has been a considerable revival of interest in Natural Law since the sixties (for obvious reasons) but some persisting objections and, more importantly, reservations in the minds of rights interest groups, have prevented its reinstatement as the formal moral foundation of law. Most of these objections and fears are due, as Professor Finnis has pointed out, to misunderstandings of the theory, especially the notion that it implies that all value judgments are fixed and indisputable. In the classical versions of Natural Law, especially that of St. Thomas Aquinas, only the main principles remain constant. As we descend through progressively less general principles, more and more exceptions will be found and the derived moral notions will also be subject to mutation with the passage of time and changes in circumstances and even altered ways of thinking. The most serious problem is not then that Natural Law notions are too fixed, but rather that in particular instances they are too flexible, with too much room for disagreement. At any one time, indeed, it is unlikely that agreement will be reached as to the right rule of conduct except in very clear cases. So beside the fact that values may conflict, there is also the problem that they may be too general and may need to scaled down into more particular and usable propositions. Thus the value of aiming at good affordable housing might easily be deduced from the social principles of Natural Law, but the precise standards by which the adequacy of rental houses should be assessed will not follow logically from first principles, but will depend on many economic and other social variables in the actual situation. Another difficulty, and a common one in law, is that more than one value may be involved and they may conflict with one another. In such cases, some or all values may have to be compromised to some extent. In very hard cases there may seem to be no good way out and we must do the best that we can. Plato describes justice as a harmony, like the tuning of a stringed instrument so that each string is its proper length. Perfect justice then would be when all the values are fully realized.[69] In the real world, of course, next-best solutions are usual.[70]

The legal profession then, has not only the duty of providing and updating calculus systems, but also the further task of developing sets of value systems for them. These should be particular enough to be usable but must also command widespread if not universal agreement. The maxims of the law admirably performed this function. They were not, as medieval lawyers sometimes supposed, axioms of natural law, but derived principles, capable of directing courts considering particular cases in the right direction.[71] We may need to develop new maxims, but in many cases the traditional ones translate well into

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[69] Republic Bk IV where temperance and justice are described as being harmonies, a condition where the different elements in the state and in the individual are each given and remain in their proper place.

[70] E.L Allen, in a series of lectures on Biblical Ethics, delivered in Belfast in 1952, commenting on the statement that politics is the art of the second best, remarked that in practical politics one may be very happy to get the eleventh best.

[71] I have discussed the maxims of the law in several articles but especially in *Ancient Legal Maxims and Modern Human Rights*. 18 Campbell Law Review (1996), 75. A short list of better known maxims is added, e.g. *qui peccat ebrius, luat sobrius* (injure drunk, pay sober).

modern circumstances. Some (a very few) are completely outdated, but the vast majority only need to be reinterpreted and rendered apt for modern circumstances by showing how they might be applied in different types of cases. Indeed the maxims, considered as guiding principles, cannot be understood without considering examples of their application in case law. This was precisely the method by which Noy, Coke and especially Bacon expounded them.

## The problem of desuetude

A major problem with a normative science of law is the status, if any, of laws which have been properly made and never repealed or replaced, but which are generally recognized as obsolete to the point that no reasonable person would dream of enforcing them. The strict normative position would be that these are valid laws whether they are being enforced or not. Authors, like Kelsen, who base law on custom, (its being received as law by the great majority of the populace), will say that the law has lapsed by desuetude, being ignored and not accepted as law by most people. Those who, with Hart, emphasize the custom of the legal profession rather than the general population, might hold that enactments which are treated as anachronisms by the legal profession so that no right thinking legal official would dream of enforcing, should be regarded as being lapsed by reason of desuetude, negative custom, and no longer law. [72]

Generally speaking the courts accept the normative view that an obsolete law is still law, but will try very hard, and probably succeed, in refusing to enforce it. [73] So far as descriptive jurisprudence is concerned, obsolete laws could be regarded as valid, but with some kind of a notation to show that they were deemed anachronistic and so unenforceable.

## Some applications of formalism in legal education, writing and practice

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[72] A version of the notion of desuetude which was argued, and in a number of cases accepted by the courts, was that where a law was on the books but no writs based upon it had been issued by the chancery, the statute was void. This view was, however, finally rejected by courts in England . The main point in the argument against it is that time could not be argued against the Crown and so statutes could never lapse by failure to observe or implement them over any period of time.

[73] For a list of such obsolete laws see Allen CK, LAW IN THE MAKING. Oxford 1964. p. 478 ff.. The Anglo-Saxon law of deodands allowed the article which caused the accidental or negligent death of someone to be forfeit to their family. The forfeit was later allocated to the Church to pay for masses on behalf of the deceased and finally to the crown who were supposed to apply it for the benefit of the deceased's family. In the case of *Regina v Western Ry Co.* 10 M & W 58 (Exch. 1845) a railway accident caused the deaths of four people. The crown claimed that the value of the train should be multiplied by four to provide for each death. The railway claimed that the assessed value of the train covered all four deaths. The court found for the Crown. These railway cases were becoming frequent and threatening to bankrupt defendants. The law of deodands was deemed obsolete and abolished in England by statute the following year (9 & 10 Victoria 1846). Its apparent irrationality may have been deceptive since there had never been any recovery by the family of the deceased other than by the law of deodands. This situation was rectified in 1850 by Lord Campbell's Act allowing recovery by the immediate family for loss occasioned by a wrongful death.

Switching over from methods and practices based on outdated notions of science to those based on modern logics, would provide a number of techniques which the law could use to advantage..

*Providing a better model for the analysis of cases.* The notion of the *ratio decidendi* as the narrowest proposition required to decide the case is probably dead or at least at death's door.[74] But its ghost lingers on in legal research generally and in legal research courses in particular. When we ask what a case decides, the answer is commonly a proposition. The better method, in full modern formal dress, would be to identify the pieces of apparatus (legal calculus) selected by the court as relevant to the case; to show how they were applied to the facts in the case; and what ends and goals (legal values) were used to guide the application. This full or complete answer is, of course, seldom required. The case may well turn on the use of a single element in the apparatus, the others being satisfied or otherwise irrelevant. In such cases it would be tedious and unnecessary for the judges to begin by laying out the entire structural form. Nevertheless, the total system is there by implication and should be kept in mind even if not explicitly mentioned. A more complete review of a decision might consider whether some of the other elements should have been considered or even whether the court should have looked at some other totally different piece of legal apparatus which was relevant to the case.[75]  This method also formalizes discussion of whether the case was well decided or not; considering whether and how far it advanced the stated values and objectives of that part of the law.

*Improving classroom teaching methods.* From the formalist perspective, it would appear that the classical case book class room method, is flawed. The student prepares by studying the case report and is then expected to find a way through the facts and the opinion to the ruling in the case. In this process the relevant law must be found somewhere, which can be a difficult task given only the usual class materials. If the first item in those materials could be an organized representation of the law, the remaining items, the cases where it was applied, would make more sense. Some might think that it is a good thing to make the student hunt around for this vital information. The extra labor is, however, irrational, like the Egyptians making the Israelites find their own straw to make bricks. Time would be better spent in mastering the appropriate

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[74] See exchanges between Professor J.L.Montrose and  A.W.B. Simpson in 20 Modern Law Review (1946). The contending authors do not agree on what actually is binding in a precedent case (material facts, judicial opinion, implied judicial opinion). Fascinating questions  are raised (but not answered) about decisions where several judges concur on the same case but give different reasoning. See especially J.L. Montrose, "*The ratio decidendi and the House of Lords.*" 20 Mod. L.Rev. (1946) p.124

[75] One publisher, whose work had been taken and used without permission by a rival company, advised his lawyers that they were making a mistake in suing under breach of copyright. The proper cause of action, since the defendant's publication was commissioned  by the government, was not in breach of copyright, but  in eminent domain.

legal apparatus, preferably in a good formal arrangement, and then seeing how it is and should be applied in the assigned cases.

*Improving the writing of judicial opinions.* A judicial opinion is intended to explain or justify the processes by which the judge decided the case. It should of course identify the areas of law in which the case is supposed to sound, the particular rules that are deemed relevant and the way in which they were applied to the facts of the case. This formal effort is not needed in every case and perhaps only in important or unusual ones. Easy cases, where the law and its application are obvious will probably not reach the appellate courts and will not therefore be reported. If the result is very obvious the case should not reach the courts at all. Good formal arrangement is more appropriate in difficult cases, complex cases and those where the law is being changed or applied in a novel way. At the very least in such cases, the relevant legal terms should be explicitly noted, defined if necessary, and any change or development in the legal apparatus should be clearly and explicitly indicated. It will also probably be of importance in such cases to identify the ends or goals guiding the application of that part of the law and how any conflict between them was resolved. All this is frequently done using the simplest and oldest of formal methods, the "and " and the "or" games deriving from the elements in the forms of action at common law.  Decisions where factors are weighed and considered do not occur in every case, but where they do, weighted or scored factor games might be helpful to the court, both in the deciding process and in justifying the conclusions in the eyes of others. Algorithms (branching logics), expressing the law in a skeleton form, would be useful in two ways. First they would help to ensure that no important item in the legal apparatus had been overlooked. Second, they would be useful as communication devices since they could indicate, e.g. by circling or otherwise drawing attention to items, the points on which the attention of the court has been focused. [See Appendix #2] It is not being suggested here that judicial opinions be accompanied by branching diagrams or scored factor lists, though one might say "why not?. A more acceptable suggestion might be that the judicial clerks accompany their briefs to the judges with formal materials to make it quite clear what they are saying and, incidentally, to show that they have been carrying out their duties in a careful and methodical manner.

*Revitalizing legal scholarship.* A senior judicial clerk of many years experience has recently commented that judges no longer cite nor pay much attention to law review articles[76]. Several possible reasons for this fact, if fact it be, could be considered. It is true that many other sources of legal information are now available, such as computer research tools and authoritative publications (such as Restatements of the Law and Uniform Statutes in the U.S.) but it appears that current legal writing is not helpful to those who are actually in the business of settling and deciding cases. Much of it is focused

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[76] Thomas L Fowler, Law Reviews and Their Relevance to Modern Legal Problems. 24(1) Campbell Law Revierw (2002) 47.

on individual decisions with comment, largely of a political nature, either bemoaning or approving the direction the law appears to be taking.  It is at this point that studies in descriptive jurisprudence, employing modern formal logics, could be helpful. These would review an area of law and present analyses of it using formal tools as already described. The branching diagram is particularly useful in comparing rules in different jurisdictions or variants of the same rule, e.g. a traditional version, a radically new version and perhaps a compromise solution. Variant algorithms not only clarify the issues, but are also helpful in allowing courts and legislators to decide which of the variant rules they should adopt. Competing policies could also be represented by factor based decisional logical forms. Review articles covering small areas of the law and accompanied by formal representations, actual or proposed, of the rules, would surely be helpful to courts and, where appropriate, to legislators

## SUMMARY AND APPLICATIONS

The main thrust of the preceding arguments is that modern notions of logic, especially those deriving from the later work of Ludwig Wittgenstein, hitherto largely overlooked, would be very helpful in the study and practice of law. It has also more particularly been argued that they could revitalize the notion of analytical or descriptive jurisprudence.

As to the nature of science and scientific method, it has been argued that thinking, and especially scientific thinking, is essentially the application of formal games to problem areas in order to achieve certain ends. This view is widely accepted and is a much more helpful model for legal science than the radical empiricism of Austin's day, or any of the epistemologies, largely modeled on hard science, that followed it. Legal practitioners and writers have, indeed, been following this method, tacitly, for centuries[77], analyzing law in terms of the elements in causes of action and using maxims as moral guide posts in their interpretation and application.

A variety of formal arrangements have been employed in recent years by other professions and disciplines that are very apt for use in legal studies. These include the algorithm of computer logic and the decisional logics used in many professions including business and clinical medicine. Examples have been appended to show how such simple devices could facilitate communication between researchers and also aid practitioners in analyzing and disposing of cases.

Third, the application of legal forms can be greatly improved by the use of established and well grounded values. The idea that values could not be based on anything other than personal preference has had a long innings, and a recent renewed turn at bat in the law. But the Law of Nature has been revived recently

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[77] Millenia, if the activities of the Roman jurisconsults are included in the reckoning.

as a foundation for rights doctrines of various kinds. Many of the concerns of rights activists about Natural Law rest on misunderstandings of Natural Law theory. The main problem, so far as law is concerned, is that the maxims are too general to be useful and must be processed in some way to produce more particular goals which can offer direction in particular cases. It has been suggested that the traditional maxims of the law, updated by linking them to case law, could be very helpful here.

Fourth, and finally, it should be made clear that descriptive jurisprudence as delineated above is not the only valid approach to the study of law. There is no such thing as a completely separate academic field; boundaries are for the most part conventional only, depending on which group of questions can be conveniently be studied together by the same researchers. Advances in understanding are commonly stimulated by an idea from another field, often a distant one. This has constantly been happening in Jurisprudence where the prevailing notions about scientific method have been used to understand and organize law. Descriptive Jurisprudence is bound to be affected by concepts from the physical sciences, social sciences, mathematics and especially philosophy. Language philosophy, the algorithm from computer science, and decisional logics from medicine and business, have been adapted for legal purposes in this article. There are no doubt many potentially useful concepts in surrounding disciplines just waiting to be noticed and put to work in the formal study of the law.

One final point: the logical forms presented here are very simple. This constitutes a problem as we tend to ignore or even despise things which are simple and prefer those which require expensive equipment and special training. Naaman the Syrian captain[78] refused Elisha's cure for his leprosy (dipping seven times in the river Jordan) and set off home in a rage. His servant, wiser than his master, remonstrated with him saying "if the prophet had asked to do some great thing would you not have done it?" We should not make the same mistake.

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[78] 2Kings Ch.5

# Appendix #1

*Schema representing the effects of plaintiff misuse of a product*
*and suggesting an alternative rule to cover such cases*

MISUSE

Unforeseeable misuse

Careless misuse

Known/ accepted misuse

ALTERATION

Personal frolic

Element of Danger/foolishness present

Really needed

ASSUMPTION OF RISK

Dangerous and unnecessary

Element of Danger/foolishness present

Primary i.e. "no duty" case

Deduct 10%

**OR**

Deduct 25%

**OR**

Deduct 50%

**OR**

Deduct 75%

**0%**
**RECOVERY**

**BY OPERATION OF LAW**

**100%**
**RECOVERY**

**BY OPERATION OF LAW**

JURY AWARD

# Appendix #2

*Schema presenting an option which would require the*
*partitioning of mental harms not otherwise separable*

Mental harm caused by
defendant's actions

Known predisposing
conditions

No known predisposing
conditions

Dft liable for
mental harm

Family history
of mental
disorder

Personality
trait

Personal history of
mental disorder

In previous schema PF liable for all
harms here

Additional harms
can be partitioned

Additional harms
are not separable

✱

Dft only liable for
additional harms cause
by wrongful acts

Court required to partition
mental harms with Dft not
liable for those attributed
to Pf's predisposing
conditions

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# Appendix #3

*S*chema formalizing the decisional processes in *Riggs v Palmer intended to clarify the jurisprudential issues raised by that case*

| Elements required for a valid will [the "AND" and "OR'" games] | → | **Policies** 1.To fulfill intent of testator 2.. Other public policies |

↓

**Actual will**

Formal elements present      Formal elements not present

Will invalid

No clash with public policy      Conflicts with public policy

Will valid

Conflict major ← Weighted or scored Decisional system → Conflict minor

Will invalid      Will valid
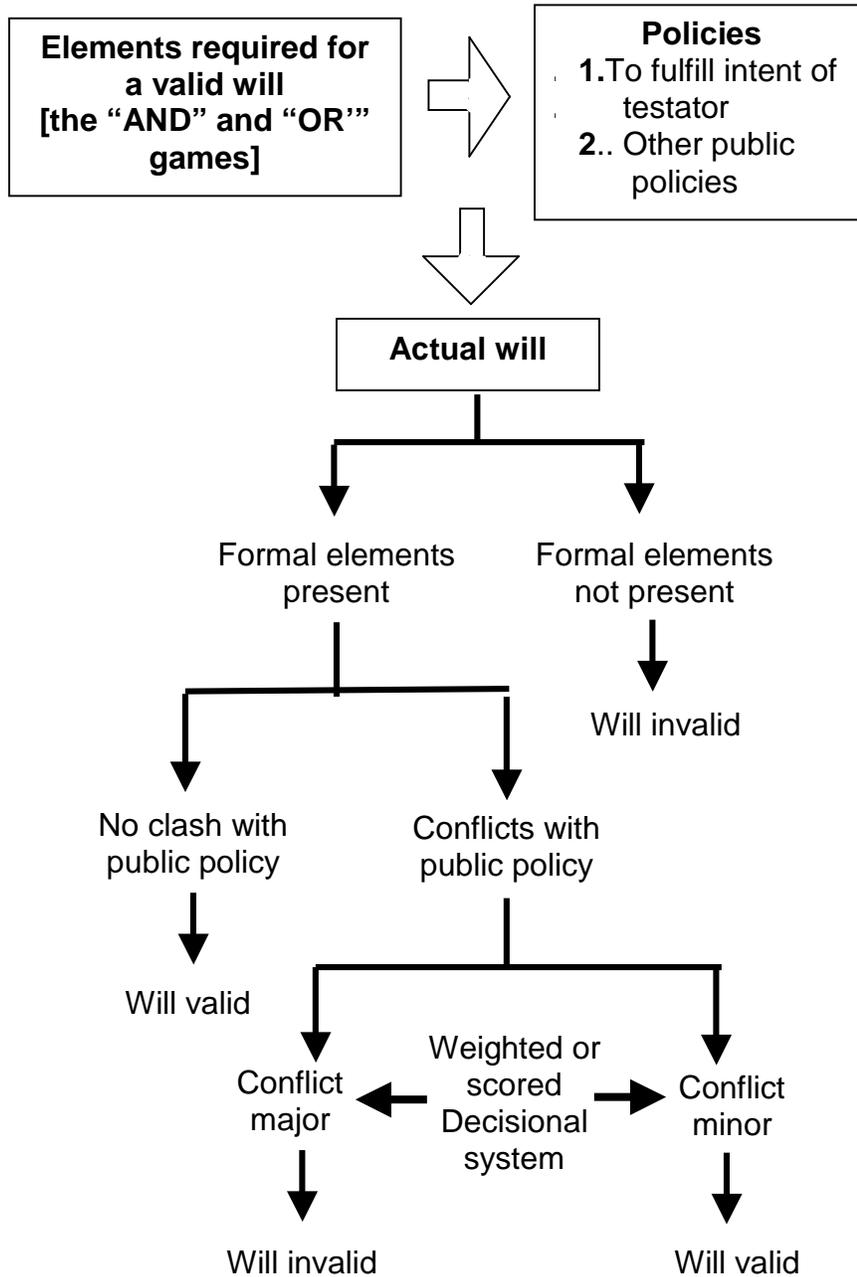
# Appendix #4
*Applying a  scored factor decisional system to a design defect case*

In *Dawson v Chrysler* the plaintiff, a police officer, was injured when his patrol car crashed into a metal pole in a culvert.[79] The pole pressed into the side of the car and the plaintiff was propelled up it to bang into the roof thus injuring his neck and rendering him quadriplegic. The proposed design change was additional metal in the frame to stiffen it and prevent collapse inward. Chrysler argued that stiffening the frame would reduce its ability to absorb force in a different kind of accident increasing the likelihood of injury, i.e. the alternative design is a polycentric proposal, where changing one aspect of a design necessitates other changes.

Twerski listed ten factors to be weighed before submitting a design case to the jury: These can be put together in a decisional system using either a weighted or a scored method

#1 Polycentric design question.
[NO = 0, YES = +2, MAYBE = +1]

#2 Are overall risk/benefit advantages of alternative design superior to challenged design .
[YES = 0, NO = +2, MAYBE = +1]

#3 State of the art technology available? .
[YES = 0, NO = +2, ? = +1]

#4 Was the harm causally connected to the design used?
[YES = 0, NO = +2, MAYBE = +1]

#5 Shifting duty: were independent responsible decision makers involved in design choices. [NO = 0, YES = +2, MAYBE = +1]

#6 Was the preservation of consumer choice in the item desirable?
[NO = 0, YES = +2, MAYBE = +1]

#7 Was the danger obvious to the user?
[NO = 0, YES = +2, MAYBE =+1]

#8 Is the estimated cost of the alternative design too high.
[NO = 0, YES = +2, MAYBE = +1]

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[79] 630 F2d 950 (N.J. 1980)

#9 Was extensive safety review included in the design process.
[NO = 0, YES = +2, MAYBE = +1]

#10 Were governmental safety regulations incorporated in the design.
[NO = 0, YES = +2, MAYBE = +1]

The scored factor system could be applied as follows.
 Polycentricity +2; close risk/benefit characteristics +1; technology available 0; causation doubtful +1;  independent decision makers involved +1; consumer choice relevant +1; danger obvious +1; costs of alternative design possibly high if gas costs are included +1; probably extensive safety review in design process +2; governmental safety regulations probably incorporated in design process +2. The total then would be 12 out of a possible score of 20, i.e., the result is just above the median line.

Since the summed score is above the median, this suggests that the result, though close, favors the defendant. And the fact that an entire line of products is in jeopardy might make it desirable that the score should be significantly below the median line before the case should be submitted to the jury. This might be especially persuasive if a weighted factor system was used also since polycentricity would probably be the main or perhaps the sole major factor, requiring only the support of a few minor factors. In the opinion of  Professor James Henderson, this case was unsuitable for jury determination. This was in fact the intuitive feeling of the judge [80]

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[80] See opinion of Adams CJ in *Dawson*. See also Henderson, *Judicial review of Manufacturers' conscious design choices: the limits of adjudication*. 73 Colum. L. Review 1531 (1973).