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The Compleat Wrangler

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In this article the author argues that the law is much like mathematics and logic. Mr. R. L. Stone-de Montpensier states that the law has its own logic, and that legal arguments are sufficiently like metaphysical arguments to be useful tools in philosophy. He then explores the process whereby legal concepts are derived through the case by case method, or paraductively, and concludes that the law appears as a calculus, containing axioms and theorems so derived. Having explored this calculus, the settlement of legal disputes is shown to be like the process of settling metaphysical disputes, and the asserted similarity of the law to logic and mathematics is thereby demonstrated.

Roy L. Stone-de Montpensier*

For *Angling* may be said to be so much like the *Mathematicks*, that it can ne'r be fully learnt; at least not so fully, but that there will still be more new experiments left for the tryal of other men that succeed us.[1]

This article might have been entitled other than it is. It might have been called by that old dichotomy Nomos and Physis which, being translated into the idiom of this thesis, might have been rendered the nature of law and the law of nature. But such a title would allow two sorts of philosophers to interplead and I wish to nonsuit both philosophers of science and philosophers of religion. The paper could have been called, with reference to Bacon's remark to the lower house of Parliament, *de vero et falso* and not *de bono et malo*.[2] But to deter the rejoinders of rustic moralists and those who talk about ethics this title too was abandoned. I call this article "The Compleat Wrangler" because in the book *The Compleat Angler* there is a discussion between the Venator, the Piscator and the Auceps about the relative merits and activities of hunting, fishing, and falconry. The genre of this article is a comparison of several disciplines which carry the metaphysical overtones of Isaac Walton's discussion. Further there is

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1. WALTON, THE COMPLEAT ANGLER 7 (Oxford ed. 1935).
2. 2 BACON, THE WORKS OF LORD BACON 278 (1850).

that remark in *The Compleat Angler* which suggests that angling is like "the *Mathematicks*."[3] The law in this sense is also like angling, for, in my submission, the law is in some respects like both mathematics and logic.

PREFATORY SUMMARY

This article argues a new theory of law — the law is a calculus having a logic of its own. Solving foundational legal problems is like solving metaphysical problems and legal arguments are sufficiently like metaphysical arguments to be considered useful tools in philosophy.

The argument proceeds along the following lines.[4] (1) Foundational studies in mathematics and logic reveal the same problems and answers encountered in foundational legal studies. (2) The truths of mathematics and logic rest upon conclusions derived by argument from axioms or postulates. In this respect the law is like mathematics. (3) Arguments concerning the inexorability of the law — why it is binding, ineluctable, irresistible and so on — are paralleled by similar questions in mathematics and logic. (4) Problems concerning the question what is a proof arise in all three. The logical status of mathematics and logic share the open-endedness seen in the legal argument over the binding force of decisions of the House of Lords. Gödel's incompleteness theorem seems to apply equally to all. (5) The logic of the law is based upon certain fundamental concepts contained in "judging." The process of judging, or deciding cases, uses certain methods which include following and not following, reconciling, and distinguishing. These methods can be compared to negation, disjunction, classification and individuation in logical systems. Further the law is concerned with *de vero et falso* and not *de bono et malo*. (6) The status of legal statements, propositions, and concepts are contained within the logic of the law. (7) A comparative study of meta-languages setting up mathematical, logical, and legal systems reveals that each uses the logic and language of ordinary speech. (8) The consistency of the law can be established by establishing the consistency of a part of a legal system. This too has an analogy in mathematics, as in mathematical induction. (9) Cases and rules of law derived from cases and lines of cases are analogous to isomorphism in formalized systems and to the use of analogies

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3. WALTON, *op. cit. supra* note 1, at 7.
4. Compare Stone, *Affinities and Antinomies in Jurisprudence*, 1964 CAMB. L.J. 266, 281.

and models in science. The differences that exist are revealing. (10) Legal concepts are derived from cases by paraduction, the case-by-case method, or *similibus procedere ad similia.*[5] (11) Cases can be similar without sharing a common factor and without being equivalent. Legal concepts are pre-eminently constituted by family resemblances. (12) The body of the law presents the appearance of a calculus containing axioms and theorems derived paraductively. Therefore, the resolution of legal disputes resembles the settlement of metaphysical disputes.

PART I

Law is like logic and mathematics because, in a developed system of law, theorems are derived from axioms not only by deduction but by that method of argument (well known to common law systems and, indeed, known to the civil law of Rome) which has been characterized for metaphysical arguments by Professor Wisdom as the case-by-case procedure.[6] This method I call paraduction. The law also uses deduction to make transformations in its calculus, but deduction is used less often than is paraduction. The paraductive argument is more interesting because where the law uses deduction it shows us nothing more interesting than what can be seen of syllogism and logic in Euclid. It is unlikely to be questioned that the legal calculus resembles a calculus in mathematics and logic where theorems of law are deductively derived from axioms of law. But a legal calculus is no less a calculus where theorems are paraductively derived from axioms.

The axioms of the law are sometimes derived from the cases themselves. This is perhaps a curious feature of a legal logic. Sometimes, however, the axioms are lost in the urns and sepulchres of mortality, having been produced or enunciated at a time "whereof the memory of man runneth not to the contrary." That is, not merely beyond legal memory but beyond all memory. Such axioms are conceivable and logically possible. Two examples will suffice. Such are two maxims, "No one is the heir of a living person" (*Nemo est haeres viventis*)[7] and "Under the title of heirs, comes heirs ad infinitum" (*Haeredum appellatione veniunt haeredes haredum in infinitum*).[8] As an historical matter we do not

5. 1 BRACTON, DE LEGIBUS ET CONSUETUDINIBUS ANGLIAE 8 (Twiss ed. 1878).

6. WISDOM, PHILOSOPHY, METAPHYSICS, AND PSYCHO-ANALYSIS 157–58, 250–52 (1953).

7. Co. LITT. 22b.

8. Co. LITT. 9.

know the origin of these maxims. But as logical matters we can appreciate their place in a legal calculus. Our inability to assign authorship or origin to them strengthens their purely conceptual condition and logical nature.

A very simplified account of the law around the year 1230 provides an example of the operation of a theorem derived from axioms. It became fashionable in those times to limit gifts of land to a living being, (let us call him A) and his "heirs," or to A and the "heirs of his body," or to A and his "issue," or to A and his "children." The judges who had to construe these gifts were faced with several possible interpretations. The gift to A and his issue, A being alive and having children, might be construed: (1) To give A the interest during his life and upon his death to pass to those issue who were living at the date of the gift; (2) to A for life and then to his issue who were living at the date of A's death; (3) equally between A and the issue who are living at the date of the gift, either (a) in common in equal shares absolutely, or (b) jointly with survivorship between the joint tenants. From the 13th to the 20th century many cases construed limitations to A and his issue and to A and his children freely, giving effect to the intentions of the grantor upon the words contained in the gift. However, the limitation to A and his heirs, was not construed freely or unrestrictedly. Rather, there was a limited application of the principles of construction. Heirs could only be determined upon the death of A. During the lifetime of the ancestor, potential heirs were called either "apparent" or "presumptive." Strictly construed, the limitation to A and his heirs did not give the heirs anything by way of purchase, for heirs were determinable only upon the happening of a future event — the death of the ancestor. No one immediately came within the class. The fact that in contemplation of law a man could have heirs ad infinitum was also used to limit or bound the interpretation so that the quantity of the estate which A took was to perdure. The result of this construction was that A took the gift to himself and heirs absolutely in fee simple. The words "and his heirs" were called words of limitation because they determined or limited the nature and quantum of A's estate. The importance of this process can be best seen by viewing it as an instance of the derivation of a theorem from two axioms. After many consistent applications from the middle of the 14th century to the latter part of the 16th century, the theorem became one of the most famous rules of law.

PART II. THE ROLE OF THE RULE IN *SHELLEY'S CASE*

About the year 1200, gifts "limited to the donee 'and the heirs of his body' " or gifts to "a husband and his wife 'and the heirs of their bodies' " emerged with some frequency.[9] These limitations ultimately gave rise to the rule in *Shelley's Case*,[10] but not by direct descent from precedent to precedent. The doctrine of strict precedent was not then in the King's court and the Statute *De Donis*[11] tolled its entry by preventing any direct line traceable at common law. The courts construed gifts to *A* and the heirs of his body and gifts to *A* and his heirs if he shall have an heir of his body as if they were the same limitation. But Bracton conceived it was false doctrine that the issue are enfeoffed along with their ancestor and held that the ancestor took an estate absolutely if he should have an heir.[12] Here we have a conditional fee at common law. "Whether he [Bracton] would have taken the further step of holding that *A*, so soon as he has a child, can make an alienation which, even when his issue have failed, will defeat the claim of the donor — that is, to say the least, very doubtful."[13] But this step was taken in the reign of Edward I. By the time of *De Donis*, a conditional gift had become known as a fee tail. About the same time, the term fee simple was used to describe the estate a man holds under the grant to him and his heirs.

In the early 14th century there was no settled construction of the limitations to *A* and his heirs or to *A* and the heirs of his body. The rule in *Shelley's Case*[14] was a rule of law which, as subsequently explained,[15] provided a construction:

> [W]herever an estate for life is given to the ancestor and propositus, and a subsequent gift is made to take effect after his death, in such terms as to embrace, according to the ordinary principles of construction, the whole series of his heirs, or heirs of his body, or heirs male of

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9. See 2 POLLOCK & MAITLAND, THE HISTORY OF ENGLISH LAW 16 (2d ed. 1923).

10. For example, in 1252 Henry III gave land to his brother Richard, to hold to him and his heirs begotten of his wife Sanchia, with an express clause stating that the land was to revert on the failure of such heirs to the King and his heirs. Placit. Abbrev. 145.

11. Second Statute of Westminster, 1285, 13 Edw. 1, c. 1.

12. 1 BRACTON, *op. cit. supra* note 5, at 135–41.

13. 2 POLLOCK & MAITLAND, *op. cit. supra* note 9, at 19.

14. Wolfe v. Shelley, 1 Co. Rep. 93, 76 Eng. Rep. 206 (C.B. 1581). According to Lord Watson in Van Grutten v. Foxwell, [1897] A.C. 658, 667, the rule was finally established by the House of Lords in 1820 in the case of Jesson v. Wright, 2 Bli. 1, 4 Eng. Rep. 230 (1820).

15. See Roddy v. Fitzgerald, 6 H.L.C. 821, 10 Eng. Rep. 1518 (1858).

his body, or whole inheritable issue taking in a course of succession, the law requires that the heirs, or heirs male of the body, or issue shall take by descent, and will not permit them to take by purchase, notwithstanding any expression of intention to the contrary.[16]

Holdsworth cited the year book in 1351[17] and again in 1365[18] where the rule was clearly laid down. The rule was also relied on in 1367.[19] Holdsworth gave two reasons for the emergence of the rule:[20] Judicial feeling from the earliest time favoring free alienation; and a desire to preserve the incidents of feudal tenure. The pattern produced by these two reasons runs through the dicta of judges from Bracton to Lord Nottingham in the *Duke of Norfolk's Case*.[21] The common law also formulated a rule against the abeyance of seisin. This resulted partly from the feeling expressed by Judge Anthony Brown that there must always be someone seized of the fee to answer actions.[22]

The law at this time decided that contingent remainders to the heirs of an unborn person were not valid. Thus, in a limitation to *A*, remainder to *B* and the heirs of his body, remainder to the heirs of *A*, it was impertinent to ask the effect of this limitation if *B* died during *A*'s life without leaving an heir of his body. *A* had to take the fee, for *A* may not have had heirs living at the time of the gift or at *B*'s death. Since contingent remainders to unborn issue were not then recognized, the gift could not be construed as a life estate to *A* with the conditional limitation over. By 1568, *Brett v. Rigden*[23] clearly stated the rule and demonstrated its application both to deeds and to wills.

The historical account of the development of the rule in *Shelley's Case* illustrates how complicated and numerous are the axioms and theorems of the law. This account is simplified merely to show that the rule depended upon decisions concerning: (1) The primitive axioms; (2) rules concerning contingent remainders; (3) future limitations; (4) class gifts; (5) the rules surrounding seisin.

The history of the rule shows it to be a product of reflection

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16. Van Grutten v. Foxwell, [1897] A.C. 658, 684–85 (opinion of Lord Davey).

17. 3 HOLDSWORTH, HISTORY OF ENGLISH LAW 107 n.7 (3d ed. 1923).

18. *Id.* at 107 n.8.

19. *Id.* at 107 n.9.

20. *Id.* at 106.

21. Howard v. Norfolk, 3 Ch. Cas. 1, 22 Eng. Rep. 931 (1681).

22. Willion v. Berkeley, 1 Plowd. 223, 229, 75 Eng. Rep. 339, 349 (K.B. 1561).

23. 1 Plowd. 340, 75 Eng. Rep. 516 (K.B. 1568).

upon other cases in which axioms and theorems were used. This history is separate from Pollock and Maitland's historic account, for it is concerned with the logical derivation of the rule.

The history of the rule illustrates that the law shows better than mathematics or logic, how we deal with rules, and how we establish, make, or discover them. Generally rules depend upon and do not precede the cases. Conversely cases do not depend upon, but precede the rules. I hope to show that this argument is a necessity. But first I want to show pragmatically how the law deals with this rule making, rule discovering, rule establishing, and rule applying technique. Here legal history is a useful source for it may indicate what is lost in the history of logic and mathematics. To discover that logic and mathematics were built up either empirically, pragmatically, or inductively may free us from the mental bondage of the necessary and the a priori. This may remove the idea that the general must precede the particular in mathematics — not as a logical conceptual matter but as a procedural, pragmatic, concern. This may in turn enable us to see the logic of cases better. Part of my thesis is that the cases, even if they reflect unnecessary matters of fact, are nevertheless concerned with logical possibility and concepts.

Between 1350 and *Shelley's Case*, about eight vastly different yet analogous cases were decided. Some had limitations in deeds and in wills which themselves contained prior gifts to heirs of the donees of those prior gifts or to the heirs of the body. The judges in 1581 declared that the reasons behind the consistent construction of gifts to *A* and his heirs were such that they could now make a general rule, the rule in *Shelley's Case*. This is an example of the judicial technique of producing a general rule of law. After the rule in *Shelley's Case* had become a rule of law, it was applied in subsequent cases as a premise in a deduction. Sometimes it was attacked — just as philosophers might attack the rules of inference, or doubt the law of the excluded middle, or the *modus ponens*. Sometimes the rule was criticized. Sometimes it was alleged that those cases which supported the rule did not warrant it. Generally the rule is "applied," "explained," or "criticized," or it is "extended," "restricted," or "limited." These are the functions which are used in dealing with a rule once it is generalized as a rule.

Let us reiterate how the judges decided *Shelley's Case*. They examined previous cases and saw the reasons for those cases, their likenesses and dissimilarities, and the family resemblances run-

ning through them. They compared the theorems derived from the axioms. The condition and results of their analysis were such that they declared a general statement of the rule that for all such cases rule R could be made. Additionally the judges saw more generally and in a more ramified and recondite way that they could make rules $R_1 \ldots R_n$, from which cases I to N could be decided.

The law is a calculus — a complex of theorems and axioms. It is not a calculus consisting only of commands, or only of rights, duties and privileges, or only of rules. The calculus theory is an explicit denial and an implicit refutation of the view that the law consists solely of commands.[24] Something must be said about the general nature of the theorems of the law. They may be counter-factuals, or like counterfactuals. Perhaps they are conditional hypotheticals, some sort of "counterceptuals." By this suggestion is meant that the law — the cases, lines of cases, rules, statutes, etc. — operates conditionally. If rule a and rule c apply, and rule phi and psi do not, then X. X is a conclusion or a theorem. A case in point is the application of two theorems; one contained in the rule in *Sibley v. Perry*,[25] and the other a simple rule of construction applied to the word "issue" when used in a limitation. Issue simpliciter means issue and remoter issue of the *persona designata* to all degrees. The rule in *Sibley* says where the word issue is used with reference to parent, then only the children of that parent are included in the description issue. A judge must consider these two mutually exclusive theorems in order to construe a gift to issue. If the rule in *Sibley* applies, then the general rule of construction does not.

Calling this activity the application of counterfactuals may be misleading. That the theorems work as conditionals seems to me to be undeniable. The urge to call them contrary to fact conditions reflects Wisdom's suggestion that legal questions are reflective, nonnecessary questions of fact.[26] To call them conditional hypotheticals reflects an unsettled element in legal entities. To call them counterceptuals, or contrary to concept conditions,

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24. See DAUBE, FORMS OF ROMAN LEGISLATION 4–5 (1956), where it is stated that, "the following nine expressions are used: *oportet, necessum est, mos est, fas est, ius est, religio est, piaculum est, licitum est, constitutum est* — but never a 'they shall' or 'shall not'."

25. 7 Ves. 523, 32 Eng. Rep. 211 (Ch. 1802).

26. See Wisdom, *Philosophy, Metaphysics, and Psycho-analysis* in PHILOSOPHY AND PSYCHO-ANALYSIS 248 (1953).

may bring out the correspondence between legal entities and mathematical entities.

I shall make an analysis of the judicial process into the settling questions relating to Alpha facts, Aleph facts, and legal concepts.[27]

27. The difficulty in deciding what is a question of law and what is a question of fact when dichotomized in the traditional form, is brought out by Lord Mansfield in Hankey v. Jones, 2 Cowp. 744, 98 Eng. Rep. 1339 (K.B. 1778):

> [w]ith great respect to Lord Chief Justice Lee's memory, I think the jury asked him a very proper question; whether this drawing and re-drawing was, in point of law, a trading in merchandize within the statutes concerning bankrupts? And as the note is taken, he might have directed them as it is there said he did. But the report says, he told them it was a question of fact, and not of law. With all deference to his opinion, it was a question of law upon the fact. It may be proper to leave it to the jury, whether the person gets a profit or remits other people's money; but the fact being established, the result is a matter of law.

Id. at 751–52, 98 Eng. Rep. at 1343.

The trichotomy Alpha Facts, Aleph facts and law takes care of this situation. Alpha facts are the facts suggested by Mansfield. Aleph facts are his question of law upon the fact, that it is the pastiche and melange I described, and the pure question of law.

Further, in Tindal v. Brown, 1 Term. 167, 168, 99 Eng. Rep. 1033, 1034 (K.B. 1786):

> What is reasonable notice is partly a question of fact, and partly a question of law. It may depend in some measure on facts; such as the distance at which the parties live from each other, the course of the post, etc. But wherever a rule can be laid down with respect to this reasonableness, that should be decided by the Court, and adhered to by every one for the sake of certainty.

In Medcalf v. Hall, 3 Doug. 113, 115, 99 Eng. Rep. 556, 567 (K.B. 1782) (opinion of Mansfield, L.C.J.).

> Nothing is more mischievous than uncertainty in mercantile law. It would be terrible if every question were to make a cause, and to be decided according to the temper of the jury. If a rule is intended to apply to and govern a number of like cases, that rule is a rule of law. If the rule be that the bill must be presented in a reasonable time, judging from the circumstances of the particular case, then the verdict of the jury is correct; but I doubt extremely whether that rule can be maintained, on account of the great inconvenience which it would occasion in the circulation of paper.

In Tindal v. Brown, *supra* at 169, 99 Eng. Rep. at 1035, Justice Buller fairly stated my view:

> The numerous cases on this subject reflect great discredit on the Courts of Westminster. They do infinite mischief to the mercantile world; and the evil can only be remedied by doing what the Court wished to do in the case of *Medcalf and Hall*; by considering the rea-

It will be shown that theorems are constituted from either legal concepts or Aleph facts, and that Alpha facts are merely the occasion for deriving new theorems or writing new axioms into the calculus. The first example of the theorem that a gift to *A* and his heirs constitutes a fee simple is an example of a pure question of law. The case of *Woolridge v. Sumner*,[28] particularly the judgment of Lord Justice Diplock, is an example of a theorem consisting of Aleph facts. As the calculus consists of both law and Aleph facts — in other words, the axioms and theorems are derived both from rules of law, rules of construction, and from cases — it is difficult to categorize the status of the axioms and theorems of the legal calculus in accordance with current philosophical vocabulary and concepts. The legal calculus preserves something of a mathematical and logical nature; for insofar as it does not relate to reality it is certain, and insofar as it relates to reality it is uncertain.

Not all matters left to the jury are Alpha facts. Where all the evidence is in, all the witnesses have been heard, all the observations have been made, and yet there is still doubt, a jury question remains. These are Aleph facts. Did the defendant in a case of tort exercise reasonable care? Lord Justice Diplock has reminded us that such a question is one of fact and not of law:

> To treat Lord Atkin's statement "You must take reasonable care to avoid acts or omissions which you can reasonably forsee would be likely to injure your neighbour," as a complete exposition of the law of negligence is to mistake aphorism for exegesis. It does not purport to define what is reasonable care and was directed to identifying the persons to whom the duty to take reasonable care is owed. What is reasonable care in a particular circumstance is a jury question and where, as in a case like this, there is no direct guidance or hindrance from authority it may be answered by inquiring whether the ordinary reasonable man would say that in all the circumstances the defendant's conduct was blameworthy."[29]

How then do judges decide cases? There are well-known judicial techniques. There is "following" and "not following" a case. This point has direct relevance to mathematics and logic. In *Remarks on the Foundations of Mathematics*, Wittgenstein asked

sonableness of time as a question of law and not of fact. Whether the post goes out this or that day, and at what time, etc. are matters of fact: but when those facts are established, it then becomes a question of law on those facts, what notice shall be reasonable.

28. [1963] 2 Q.B. 43, 60 (opinion of Diplock, L.J.).
29. *Id.* at 66–67.

what it was to follow or not to follow a rule or proof.[30] There are two techniques which are fundamental to legal ratiocination or paraduction and which are related to two fundamental matters in logic and epistemology. These techniques are "distinguishing" and "reconciling." We distinguish or reconcile cases, lines of cases, and rules or maxims. "Distinguishing" is like "individuation" and "reconciliation" is like "classification." Individuation and classification seem to me to be fundamental and irreducible mental faculties. They are the epistemological correspondences of legal distinguishing and reconciling; and logical "negation" and "disjunction." The correspondence between these techniques reflects the connection between epistemic and alethic modes and seems to me an argument in favor of the view that the truth functions of law, like those of logic, are alethic and not deontic.

The whole of logic can be reduced, so Whitehead and Russell tell us in *Principia Mathematica*,[31] into two functions, negation and disjunction. Negation is like distinguishing and disjunction is like reconciling.[32] These connections with logic and mathematics enjoin us to consider other similarities in the use of cases. We must now consider what is said to be the great barrier between the logician and the metaphysician. One loves rules and the general and the other prefers cases and the multifariousness and richness of comparing instance with instance; one prefers beauty and truth and simplicity to life, and the other sees truth and beauty and simplicity in life. Wang said that formalization in mathematics and logic is no more than a comparison of the systemized, tightened application of intuitive analogies.[33] Further, "formalization and abstraction serve as tools of thinking and research."[34] Formalization also provides speed, economy of thought, and help in avoiding "messy results."[35] But we can do without

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30. WITTGENSTEIN, REMARKS ON THE FOUNDATIONS OF MATHEMATICS 2–5 (1956). See also WITTGENSTEIN, THE BLUE BOOK 12–13 (1960); WITTGENSTEIN, PHILOSOPHICAL INVESTIGATIONS §§ 206–40 (1963).

31. See 1 WHITEHEAD & RUSSELL, PRINCIPIA MATHEMATICA 46–47 (2d ed. 1925).

32. Reconciling can be thought of as conjunction as well as disjunction. A lawyer may be happier with conjunction although the construction of a gift by will to *A* or *B* is sometimes construed conjunctively and sometimes disjunctively. In this usage, therefore, they seem to be antinomies whereas in logic conjunction is the mirror image of disjunction. One could say that they are completely dual.

33. See Wang, *On Formalization*, 64 MIND 226 (1955).

34. *Id.* at 231.

35. *Id.* at 238.

formalization. This point ought to be stressed because there is a tendency to think that those who use the paraductive method are not doing anything which relates to logic. There is a counter point. When driven by the exasperating attacks of the logician to consider the inventive systems they build, those who indulge in informal concepts and arguments might reply that formalization can tell us nothing we did not know already. Formalization can do what a study of cases does for a law student and what the product of rules like the rule in *Shelley's Case* does for a lawyer — that is, it makes analogies more perspicuous, easier to see, easier to grasp, and more accessible. It does not affect the logical status of the isomorphic and make it more logical, precise, valuable, or valid than the informal analogies. Wang told us that analogy and intuition, great aids in argument, are used when we consider that the formal matters which obtain in the cases of accessible numbers also obtain in the domain of the inaccessible numbers.[36] The activities of approving, disapproving, doubting, criticizing, explaining, discussing, reversing, overruling, affirming, commenting on, preferring, and so on, have a well known place in the legal calculus. In *The Aello*,[37] Lord Radcliffe discussed the concepts of "port area" and "an arrived ship." He explicitly stated that he preferred a particular line of authorities discussed by Lord Justice Kennedy in *Leonis Steamship Co. v. Rank Ltd.*,[38] to that line of authorities discussed by Lord Justice Buckley in the same case. Lord Radcliffe felt the account of Kennedy contained not merely a deeper and longer analysis of the cases, but was free from "internal inconsistencies."[39] He further pointed out that the analogy cited by Buckley was not commensurate with the facts, and that he was stretching the analogies too far.[40] It is interesting that Lord Radcliffe should have discussed "conception of commercial area," "internal inconsistencies," and "analogy,"[41] because part of my thesis that the law is calculus is that consistency

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36. See WANG, *Eighty Years of Foundational Studies*, in A SURVEY OF MATHEMATICAL LOGIC 34, 40 (1964).

37. [1961] A.C. 135 (1960). In *The Aello* the question was whether the Aello was or was not an arrived ship until October 29, for when she was anchored in the roads she was not within the commercial area of the port, namely, that part of the port where a ship could be loaded when a berth was available. See *id.* at 165–68.

38. [1908] 1 K.B. 499.

39. [1961] A.C. at 166.

40. *Id.* at 168–69.

41. *Id.* at 168.

is written into the system. So too Lord Mansfield used "fallacy" in relation to analogy.[42]

I want to show in the end that mathematicians, logicians, and scientists rest their laws upon comparisons of the likenesses and dissimilarities of particular cases. Gauss used this means to prove that imaginary numbers were numbers.[43] He put the natural number series in a Cartesian coordinate upon the horizontal axis

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42. See Miller v. Race, 1 Burr. 452, 457–59, 97 Eng. Rep. 398, 401–02 (K.B. 1758):

> But the whole fallacy of the argument turns upon comparing bank notes to what they do not resemble, and what they ought not to be compared to, viz. to goods, or to securities, or document for debts.
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> Now they are not goods, nor securities, nor documents for debts, nor are so esteemed: but are treated as money, as cash, in the ordinary course and transaction of business, by the general consent of mankind. . . .
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> A bank-note is constantly and universally, both at home and abroad, treated as money, as cash; and paid and received, as cash; and it is necessary, for the purposes of commerce, that their currency should be established and secured.

A typical misconception in a lawyer's writing is that of Mansfield's biographer who in the face of Mansfield's own use of analogy and the judicial process persists in talk of deduction as the aim of law and induction as the method of Mansfield:

> Co-ordination, however, has its peculiar perils. While the jurist is transforming a series of unrelated observations into a complex abstraction, the raw material upon which it is based tends to become ever more remote. The end is forgotten in the means, and the process of generalization, designed to produce a principle for the guidance of future conduct, is pursued, without ulterior motive, as an intellectual exercise. Lord Mansfield's mind was of too practical a cast to cherish this illusion. Even while he made his inductions he retained a vivid impression of the facts of litigation, and remembered that his function was not to foster scholastic controversy, but to satisfy merchantile interest.

FIFOOT, LORD MANSFIELD 93 (1936).

The law is exactly the same and fully settled upon the analogy of promissory notes to bills of exchange, which is very clear when the point of resemblance is once fixed. While the promissory note continues in its original shape of a promise from one man to pay to another it bears similitude to a bill of exchange; when it is endorsed the resemblance begins, for then it is an order by the endorser upon the maker of the note to pay the endorsee. This is the very definition of a bill of exchange. This line of reasoning from analogy Fifoot calls, and wrongly so, Mansfield's "inductions." *Ibid. Compare* Fifoot's "facts of litigation," *with* Milsom's "The logic of a trial, and the logic of a battle," in Milsom, LEGAL INTRODUCTION TO NOVAE NARRATIONES (80 Selden Society 1963). It is significant that Milsom can use a somewhat technical term "fallacy" in connection with analogy.

43. WAISMANN, INTRODUCTION TO MATHEMATICAL THINKING 10 (1951).

and the imaginary number series upon the vertical axis. By rotat-
ing ninety degrees, he moved the imaginary number series into
the series of natural numbers. This immediately brought to his
notice so many likenesses with natural numbers that the hitherto
fantastic and disputed numerical entities were henceforth properly
thought to fall within the concept of number. The same sort
of procedure was used with infinite numbers. No formal proof
was used nor were deductions made from definitions: merely com-
paring and contrasting known but unseen features revealed the
number-like nature of infinite numbers. Strawson states categori-
cally that in logic the rules of inference (if A is bigger than B,
and B is bigger than C, then A is bigger than C) are based upon
what he calls "formal analogies."[44] His discussion, but for the word
"formal," corresponds with the procedure which lawyers at com-
mon law have used for centuries, and which some metaphysicians
now show to be at the bottom and at the end of all arguments.
Einstein, in the second lecture on the meaning of relativity, inter-
estingly used the possibly metaphorical "a glance at" when he
said: "A glance at equations (23) and (24) shows that the Lorentz
transformation so defined is identical with the translational and
rotational transformations of the Euclidean geometry, if we dis-
regard the number of dimensions and relations of reality."[45] This
seems to be no more a logical activity than does distinguish-
ing and reconciling. The further activities which the law has
developed are sophisticated maneuvers which refine the basic and
fundamental activities of distinguishing and reconciling.

We must now turn to consistency and the law. How did the
law achieve consistency? Here again there are parallels with logic
and mathematics. What is the logical status of the rule laid
down in *London Tramways Co. v. London County Council*[46] that
the decisions of the House of Lords are binding upon itself? Some
critics say that the decision heaved itself up by its own boot-
straps and that its arguments were circular. Even if this is true,
my argument that the law is logical still holds. As Wittgenstein,
Ramsey, and Russell have done, we can say that logic is a tau-
tology. I cite Ramsey's famous aphorism[47] that "logic issues in
tautologies, mathematics in identities, philosophy in definitions."
I do not, however, wish to rely on this argument. The *London*

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44. STRAWSON, INTRODUCTION TO LOGICAL THEORY 45 (1952).
45. EINSTEIN, THE MEANING OF RELATIVITY 35 (1923).
46. [1898] A.C. 375.
47. RAMSEY, FOUNDATIONS OF MATHEMATICS 264 (1931).

Tramways Co. decision carries with it a principle of consistency. Whether the consistency principle is derived from the law itself, or from some rule of interpretation put into the law by the meta-language setting up the law, shall not be discussed here. Which-ever way, it is my submission that the law is consistent and the law must be consistent, just as, and in the same way as, and for the same reasons as, mathematics and logic must be consistent; much in the same way as metaphysics must be consistent if meta-physics is based upon rational argument. This follows since the product of rational argument must always be consistent.

Consider the situation if the House of Lords established a rule that "the decisions of this House are not binding upon the House." This would involve a paradox similar to that produced by the Cretan liar who said "I always tell lies." The discussion of Whitehead and Russell[48] is also relevant to the House of Lords' rule in this matter. It seems to me also that Gödel's results would also apply, for the rule, even though concerned with consistency, is not provable within the legal system. If it were provable, it would be refutable; since the rule is not internally provable, it is irrefutable. To ask for the logical status of the rule in *London Tramways Co.* does not place me in an embarrassing position any more than does Gödel's theorem place logicians and mathema-ticians in such a position. Similarly, it is arguable that once the question of papal infallibility arose in the 19th century, it had to be answered in favor of infallibility if the decision was to be rational, consistent, and logical. It is perfectly true that people can act inconsistently and say and do contradictory things. But once they animadvert and decide rationally what they are doing, they must decide in favor of a consistency principle. This is another *"point de rattachement"* between law, logic, and mathematics, and yet another correspondence pointing to the calculus-like feature of the law.

How can we prove that their decision in *London Tramways Co.* is binding upon the House of Lords? I would not cite an authority for the proposition to be proved. I would do what is done in mathe-matical induction to prove the consistency of mathematics by reference to the consistency of a part of mathematics, as is sug-gested by Waismann.[49] I would ask the would-be objector a gen-

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48. 1 WHITEHEAD & RUSSELL, *op. cit. supra* note 31, at 60.

49. See WAISMANN, *op. cit. supra* note 43, at 100. The question of proof and its validity or justification arises in the law as well as in mathematics, logic and the natural sciences. Bacon in his arguments at law uses the expres-

eral question of law which I happen to know was decided in the House of Lords. I would ask him: "Do you know that the legal concept of charity, or charitable purposes is, for the relief of poverty, the advancement of religion, the advancement of education and for other purposes beneficial to the community?" If honest and not perverse he would have to answer affirmatively.

"Where was that laid down?"

"In *Pemsel's Case*[50] per Lord MacNaughton in the House of Lords."

"And do you know that moneys paid under a mistake of law are not recoverable?"

"Yes," he would have to affirm, "it was laid down in *Sinclair v. Brougham.*"[51]

"And do you know that a gift for charitable or benevolent purposes is void if not charitable?"

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sion "I shall prove plain" and in the same sense "I will show." Proof is said to be strict, formal, rigorous, rigid and valid. In logicomathematical systems there is a relativity of proof which is generally characterized along a manifold bounded at either end by informal and formal. The more ramified and formalized the logic and the less intuitive the concepts employed in it the greater the formal validity is attributed to the proof. In law likewise there is a relativity of proof. The facts must be proved by evidence. The case must be proved in criminal causes beyond all reasonable doubt, and in civil actions upon the balance of probability. A legal point is established by paraduction, sometimes by deduction. The most formal proofs seem to arise in law over proof of title to realty. 1 PRESTON, ABSTRACTS 9 (2d ed. 1823) gives formal abstracts and uses the expression "deducing title." Likewise, WITHERS, REVERSIONS 5–6 (2d ed. 1933), writes:

> But, in advising on title to equitable interests in personalty, the conveyancer *cannot* confine his attention to matters appearing in the Abstract and wants to be satisfied that the beneficial interest in question is not subject to any such equity, *i.e.* to obtain conveyancing evidence, if not legal proof of a *negative*.
>
> Generally speaking, the most important negatives to be established are . . . .

BULLEN & LEAKE, PRECEDENTS OF PLEADING 691 (2d ed. 1863), discusses how a case should be proved in pleadings both as to the facts to be alleged and established, what inferences can be made and what evidence is required, and as to law what arguments and cases are necessary. Keating and Willes suggest that "pleadings must be perspicuous." SMITH, LEADING CASES 103 (4th ed. Keating & Willes 18—). This reminds us of Russell's requirement of proof in WHITEHEAD & RUSSELL, *op. cit. supra* note 31, and Wittgenstein's comment upon it in WITTGENSTEIN, REMARKS UPON THE FOUNDATIONS OF MATHEMATICS (1956). My point is that proof need not be formal, strict, rigorous, rigid, and so on to be convincing or to be a proof.

50. Commissioners for Special Purposes of the Income Tax v. Pemsel, [1891] A.C. 531, 583.

51. [1914] A.C. 398.

We would have to say, "Yes, for it was laid down in *Grimond v. Grimond*."[52]

"And so what would happen if you distributed a fund to hospitals under a gift for charitable or benevolent purposes? Could the money be recovered?"

"Yes," he would admit, "it was decided in the case *Re Diplock's Estate*."[53]

The *Diplock Case* was a theorem derived from the three axioms laid down in *Pensel's Case*, *Sinclair*, and *Grimond*. It was inexorable, ineluctable, and necessary that *Diplock's Case* be decided as it was. The theorem was derived from the cluster of three cases in accordance with legal arguments. These decisions of the House of Lords are theorems, and the law being what it is, they could not be otherwise. They are paraductive and consistent. There are other clusters of cases, hundreds of cases, forming part of the legal calculus which are consistent in themselves and demonstrate the consistency of the rest of the calculus. These clusters of cases prove such propositions as: (1) The rule in *Shelley's Case* is a rule of law; (2) Money, when used in a will, may include real property. (n) . . . .

That the objector would accept these propositions as a rules of law because they are decisions of the House of Lords would argue in favor of his accepting the proposition "the decisions of the House of Lords, are binding on itself," because the decision is within the series $1 - n$. This decision is one of a series of decisions of the House of Lords. Once we know the nature of the series, as Wittgenstein notes, we know how to go on. It is not so much what the House of Lords said which is under discussion, but that it has said it.

The axiomatic treatments may cause some concern that the calculus like nature of the law may suggest that certain features which are relevant to the nonnecessary reflective nature of law are obfuscated or obscured. I do not think these features have been completely destroyed. Remembering that the foundational problems in mathematics and logic, and the arguments supporting each resemble the foundational problems of law, and that the arguments supporting each and all of them resemble one another, and that these problems are themselves part of epistemology and part of metaphysics, should keep the metaphysical or overtly philosophical nature of legal concepts, and the concepts of law, before us. Finitism, conventionalism, intuitionism, Platonism,

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52. [1905] A.C. 124.
53. [1948] All E.R. 429 (C.A.).

Pythagoreanism, transfinite realism, and so on have their counter-parts in the command theory, the normative theory, American real-ism, Scandinavian realism, the rule theory, and natural law theories of law. Another feature lending support to this confidence is the re-flection that some mathematicians and logicians thought a satis-factory set theory would solve, dissolve, or resolve, foundational problems in mathematics and logic. As Wang has pointed out, this was but a vain hope, and eighty years of foundational studies have left the problems unsolved though not quite where they were.[54]

The next argument relating to rules proceeding from cases brings the calculus of the law into line with the metaphysical nature of certain legal questions and the ultimate metaphysical nature of the concept of law itself. Suppose there was a rule that all rules precede cases. How could we prove that rule to be true? We would proceed, in my submission, as follows: Rule 1 estab-lishes that all rules precede cases. Rule 2 states that rule Ri pre-cedes cases 1 . . . n. Rule n shows that Rule Rn precedes cases 1n . . . nn. Again, Rule A says that it precedes cases 1 . . . n. Rule Alpha . . . Rule Aleph . . . taw, and so on. Now this in itself shows cases of rules preceding the general rule that all rules pre-cede the cases. In my submission, this is a proof that the cases precede the rules. This submission is borne out by a study of every rule of law or rule of construction within the law. Although it is a pragmatic matter, every rule which is known as the rule in a case, is maintained by, supported by, derived from prior cases. These cases too, have been argued case-by-case, paraductively. This fact puts the original statement about the status of the axioms — such as a person can have an heir till the end of time, which I suggested was a logical possibility — in a curious position. Even this axiom falls within the last proof that the cases support the axioms of the law. I do not think that it is objectionable that axioms are proved by the cases. It is not objectionable because axioms could and can be given as postulates, and may be sub-sequently verified or falsified.

In this formal proof that the rules depend upon the cases, it may seem that we have run serially through cases, or rules pre-ceding cases. It may thus be objected that this is an empirical matter and can not prove a logical point any more than running through all even numbers to see that they divide into the sum of two primes can prove the theorem that all even numbers are the sum of two primes. How we prove the theory that all even

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54. See Wang, *supra* note 33, at 54–57.

numbers are the sum of two primes, how we prove that rules pre-cede cases, how we establish the modus ponens involves the question of how we prove that anything is a proof. The question "Is this a proof?" reminds us of the questions "Is this a number?" "Is this a law?" "Is this a dog?" These are metaphysical problems, and are answered in the case of proof by considering actual and possible cases of proof. We do this by using the family resemblances, argument, and paraduction.

Thus, following Wittgenstein's advice,[55] we run through different sorts of proof to see the family resemblances in mathematical, logical, scientific, factual, legal, and historical proofs. We see that paraductive argument is a proof — a proof as convincing as any proof can be. The paraductive argument serves, as we have seen, as a proof for Gauss, Einstein, Strawson, and the courts of law. We find it when Proust proves that there is no such thing as love, when Polya[56] examines the patterns of plausible reasoning, when Waismann considers number, when Freud sets up his proof of the unconscious or the validity of the interpretation of dreams, and finally it serves for Sir Thomas More to show the right to disobedience. Another story which lies behind the arguments relating to the interpretation of Wittgenstein's "family resemblances,"[57] and a closer account of the nature of legal argument and the judicial process, will reveal the truth of the aphorism that the law consists of ratiocination not rationalization.[58] It may be objected that the formulation of the logical status of a legal calculus of axioms and theorems obscures the possibility that there are exceptions to rules. In mathematics, for example, the rules admit of no exception. Take for example the rule that no even number except two is prime. Now if there is an exception to this rule in mathematics we would have to throw away the rule. In law, the development and derivation of a rule from the cases may not operate like this. If there is an exception we would not have to throw away the rule. The old adage "the exception proves the rule" may operate.

The fact that there are exceptions to the rule does not really trouble the lawyer. When the exceptions eat away the rule, then lawyers reanalyze the status of the rule by looking again at the

55. WITTGENSTEIN, PHILOSOPHICAL INVESTIGATIONS §§ 66–74 (1953).

56. See POLYA, MATHEMATICS AND PLAUSIBLE REASONING (1954).

57. WITTGENSTEIN, *op. cit. supra* note 49, at §§ 66–74. See also Bambrough, *Universals and Family Resemblances,* in 61 PROCEEDINGS OF ARISTOTELIAN Soc'y 207 (1960–61).

58. *Cf.* Stone, *Ratiocination Not Rationalisation* 74 MIND 463 (1965).

cases which support it. This leads to a suggestion that it is logically possible for a judge to make a mistake in the House of Lords and propound "internal inconsistencies" as Lord Justice Buckley purportedly did.[59] My thesis, however, does involve us in the idea that it is not logically possible for the House of Lords to be mistaken, just as it is not logically possible that two and two should not make four. Lord Radcliffe and Lord Reid in *Nash v. Tamplin & Sons*[60] approached this position in the following remarks:

> My Lords, the decision of this House in *Usher's* case has been often alluded to and sometimes explained. More than once it has been rather explained away than explained: for I think that it has come to be regarded as a special case, the principle of which it is difficult to discover and almost impossible to extend.[61]
>
> My Lords, it is very unsatisfactory to have to grope for a decision in this way, but the need to do so arises from the fact that this House has debarred itself from ever reconsidering any of its own decisions. It matters not how difficult it is to find the ratio decidendi of a previous case, that ratio must be found. And it matters not how difficult it is to reconcile that ratio when found with statutory provisions or general principles: that ratio must be applied to any later case which is not reasonably distinguishable.[62]

Their position reminds us of Whistler's observation "two and two the mathematician would continue to make four, in spite of the whine of the amateur for three, or the cry of the critic for five."[63] Dr. Johnson argued in this way when someone was obtuse about the gender of a Latin word. In answer to the claim that there was a reason for the suggestion, Dr. Johnson said, "You may have a reason for making two and two five, but that does not make it so." Now many mathematicians in the past and some logicians, like members of the House of Lords, have said different things and have given reasons for their statements. But in mathematics and logic the alleged reasons do not make two and two anything but four. Judgments and opinions are like these reasons, they are marks on paper, but they do not constitute the law. The reasons are not legal entities. One of the constituents of law is what lawyers call the ratio decidendi of a case or a line of cases. Some talk of extracting the ratio decidendi from the case. The ratio of a case, we can say without going into the much discussed

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59. See The Aello, [1961] A.C. 135, 166 (1960).
60. [1952] A.C. 231 (1951).
61. *Id.* at 256 (opinion of Lord Radcliffe).
62. *Id.* at 250 (opinion of Lord Reid).
63. WHISTLER, THE GENTLE ART OF MAKING ENEMIES 26 (3d ed. 1904).

analysis of it, is rather like the hidden qualities which Bacon saw in the simple forms. The view that judgments must be taken literally is like mistaking the simple forms for the latent qualities, or mistaking that which one would put in the table of presences for the interpretation. The law is not like this. If we resort to the analogy of models and analogies in sciences, there are relationships between features which are present but latent and which are not revealed by the simple forms. In science these analogies are said to be of service in seeking or confirming hypotheses. In the law however these relationships or analogies are legal entities. They have an analogy to mathematics and compare and contrast with points, vectors, tensors, triangularity, number, and so on.

The ratio decidendi is a logical construction. This is why decisions of the House of Lords cannot be wrong. There is a consistency principle and the calculus operates ultimately with logical construction. It is not that judges may not say silly things and make elementary mistakes in what they say and how they say it.[64] If the judges cannot make mistakes, a sceptic may insist that here is a difference between law and mathematics. The argument, however, is that decisions of the House of Lords cannot be wrong, not that judges may not be mistaken in what they say and sometimes speak irrationally. Mistakes in mathematics, like mistakes in law, cannot alter the fact that the truths of mathematics and law remain truths. This likeness, however, brings out a dissimilarity. Law and mathematics may be disparate. The truths of mathematics are said to be necessary, the truths of law are non-necessary. There are other dissimilarities. The doctrine of

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64. My argument here is supported by Fitz-Gerald v. Pole, 4 Bro. P.C. 439, 448, 2 Eng. Rep. 297, 304 (H.L. 1754):

Lastly, that there have been judicial determinations, and one upon this very policy, in favour of what the plaintiff in error contended for, unreversed and unappealed from; and people probably have transacted losses upon their authority, and entered into contracts according to the sense judicially received. That in mercantile contracts, especially for the sake of certainty, it is better to adhere to decisions, even if they were at first erroneous. That all new contracts were made in the sense of the judicial determinations; and supposing an interpretation at first wrong, it becomes afterwards unjust and highly inconvenient to vary from it.

And in Vallejo v. Wheeler, 1 Cowp. 143, 153, 98 Eng. Rep. 1012, 1017 (K.B. 1774), Lord Mansfield said: "In all mercantile transactions the great object should be certainty: and therefore, it is of more consequence that a rule should be certain than whether the rule is established one way or the other. Because speculators in trade then know what ground to go upon."

precedents, the precedence of precedents, the hierachy of authori-
ties, the use of words in the law, cabin, crib, and confine the
law. The use of certain words in the law, the need to come to a
decision, and limiting the issue to be resolved by arbitrary plead-
ing of plaintiff and defendant, may limit the range of argument
and make the law both orthodox and hetrodox, idiosyncratic yet
paradigmatic. The connections and relations between mathematics
and logic on the one hand, and the law on the other are not isomor-
phic but analogous, not equivalent or identical but alike and
parallel.

The argument in support of this calculus thesis amounts to
showing that the resemblances between the law and mathematics
and logic are such that we will cease to think of the foundational
questions of law in the narrow ways of our forefathers who have
talked about them by resorting to constitutional history, etc., but
that we shall think again. We may then see that matters of logic
and possibility and concepts are involved in these studies. Also
if it can be shown that the law has such close analogies with
mathematics and logic, mathematicians and logicians may start
thinking again about the so-called omnipotence of formal sys-
tems and reconsider their own foundational studies as Wang,
Wittgenstein, and Waismann have done. They may reconsider the
metaphysical nature of their own disciplines. They may cease to
consider set theory as a solution to the riddles of the foundations
of logic and mathematics. They may cease to worry about the
necessary nature of mathematical and logical truths for legal truths
are not necessary. They are nonnecessary truths obtained by
reflection upon the cases. Perhaps mathematical and logical
truths are nonnecessary too. Thus, we may also reexamine what
are "proofs, bindings," etc. We are again in the realm of episte-
mology. This is why this is a philosophic article.

Finally, the question, "what are the truth values of the law"
remains to be discussed. The law proceeds from justice and not
towards it. By that I mean that in the days of old, Chaucerian
days when the sergeant of the law knew a hundred cases
"conned and learned by rote," judges, people of enormous emi-
nence like Bracton, Seagrave, Pateschali and Ralleigh, went on
Assize. They tried cases, *primae impressionis*, involving issues
never decided before. Suppose that Bracton had a case at
Gloucester to divide a baby in half, not like Solomon to obtain
evidence, but a partition action. Bracton would not have known
at first quite what to do. He would have heard all sorts of argu-

ments and then decide the case; since "equality is equity,"[65] he may have decreed that the child be divided in two. If at Worcester there was a case on all fours with the Gloucester case, what should he have done? He should have directed the child be divided in two. But this time not for the sake of justice, but because some beastly registrar clerk had a book containing the report of the case at Gloucester. The clerk, sitting in front of him, upon noticing Bracton about to expatiate upon justice and read out the Nichomachean ethics, might well have turned around, rested upon one knee, tapped his sleeve, and said "but you decided at Gloucester on Easter term that the child must be divided in half." It shall be taken for a precedent, the judge shall award it, the law allow it. This is how the law proceeds and how the law is made, declared, discovered. Now what does the law do with analogy, distinguishing and reconciling, actual and hypothetical cases, building theorems upon axioms and sometimes writing new axioms as Lord Atkin did in the snail in the bottle case, *Donoghue v. Stephenson?*[66] It is building, constructing, discovering a logic perhaps informal but rigid, a calculus of discernable moves, and a logic whose truth functions are what Bacon once called *de vero et falso* and not *de bono et malo*.[67] Its modes are alethic and not deontic. This again shows how much the law is like logic and how logic is like the law. Remember here again Ramsey and Wittgenstein regarded logic as a "normative science."[68] Now there are some who suggest that the fundamental legal conceptions are concerned not with the value true and false, but with right and wrong. All that can be said in rebuttal is that the law is a calculus whose logic is largely paraductive, concerned with reflective nonnecessary truths. The ratiocination of the law is brought to bear upon matters of law, which are for the judge and seem to be conceptual matters; matters of Aleph fact which are pastiches and melanges of Alpha fact and law, fitted and squared to answer a question such as "Is this negligence?" "Is this murder?"; and Alpha facts which are matters of fact or contingent matters to be decided by evidence and observation such as, "Did Vacquier put poison in the salts bottle?" "Did Reginald de L. lay Joan on the floor and put his hands up her silken skirts?" To illustrate, if in the last example the

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65. FRANCIS, MAXIMS OF EQUITY maxim 3, at 11 (1823).

66. [1932] A.C. 562, 578.

67. 2 BACON, THE WORKS OF LORD BACON 278 (1850).

68. See WITTGENSTEIN, *op. cit. supra* note 49, at 38, citing a conversation with Ramsey.

jury decided that Reginald de L. had, in fact, acted as was alleged, an Alpha fact, it is then for the jury upon the judge's direction as to law to decide the Aleph fact "Did this constitute rape?" "Is Reginald de L. guilty of rape?" Yea or Nay.

Presenting the law as a calculus illustrates how the law is binding, inexorable, compelling, ineluctible, irresistible, as are mathematics and logic. A rule of law as was pointed out in *Van Grutten v. Foxwell*[69] is inflexible. The rule operates invariably, and so to speak, automatically whenever the limitations are such as to call for its application. It enables me to retort to those who claim that the law is composed of commands or norms with the riposte that Ramsey once told Wittgenstein that logic was a "normative science." Thus we preserve the calculus. By bounding the logic of law with truth and falsity we reestablish the resemblance between both mathematics and law; and logic and law. Finally, a citation from authority. Lord Mansfield, in *The Case of John Sommersett*,[70] said:

> The state of slavery is of such a nature, that it is incapable of being introduced on any reasons, moral or political, but only by positive law, which preserves its force long after the reasons, occasion, and time itself from whence it was created, is erased from memory. It is so odious, that nothing can be suffered to support it, but positive law. . . .[71] We cannot in any of these points direct the law; the law must rule use. . . .[72] Fiat justitia, ruat coelum.[73]

It has been my argument that the law has been given content. Its vagueness has been filled out by showing that legal entities subsist and like mathematical entities can be put into a coordinate bounded by truth and falsity. This argument brings out the difference between ethical relativists, objectivists, and sceptics. The relativist says that we can compare the cases but not acquire knowledge. The objectivist says that we can compare the cases and acquire knowledge. Finally, the sceptic says we cannot compare the cases. The relativist considers the cases as algebraic. That is, as variables to which numbers cannot be assigned. The objectivist considers the cases as arithmetical. He would claim that facts, even where diverse and variable, can nevertheless be made constant by assigning numbers to the variables. Thus the objectivist can put all moral cases on a coordinate bounded at either

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69. [1897] A.C. 658.
70. 20 State Tr. 1 (K.B. 1772).
71. *Id.* at 82.
72. *Id.* at 80.
73. *Id.* at 79.

end by right and wrong. He can then assign a place along that coordinate to the case under discussion, and thus claim objectivity for ethical judgments and so claim that there is moral knowledge. However, assigning a place in the coordinate is no more proof of the existence or reality of ethics than putting imaginary numbers along a Cartesian coordinate is proof that imaginary numbers of geometrical form do exist or are real. The distinction between law and ethics is brought out. The coordinates of law are bounded by truth and falsity, whereas those of ethics are bounded by right and wrong. The logic of the law is alethic — that of ethics is deontic. The objectivity of ethics resolves into the question whether right and wrong relates to reality in the same way as truth and falsity relate to reality. This is an epistemological question. Raising it in the context of calculus, legal, logical and mathematical, distinguishes the law from ethics.

This is my case.