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LOGIC IN THE LAW

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The relation of philosophy to the law is both dynamic and genetic. Philosophy, as a comprehensive body of theory about the most pervasive and basic questions of the universe, embraces the most basic and pervasive questions of the law. If and to the extent that its claims are justified, philosophy is a dynamic instrument for the law, a mode of thought having potential values for the better understanding of the law. Moreover, the men who have made and administered the law, and those who have sought to understand it, have come directly or indirectly under the influence of philosophy. Thus philosophy as a cultural tradition may have had its social consequences, including its consequences to law. Either of these relations can easily be exaggerated. The present essay proposes to examine the dynamic or instrumental relation to the law, rather than the historical relation, of one branch of philosophy: Logic. While many have written on the philosophy *of* law, but few have attempted to explore the significance of philosophy *in* the law.[1] The method of this formidable task will be to examine the concepts and theories of logicians and to try to show what bearing

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1. This article is designed to form part of a series on philosophy in the law, which include discussions of ethics, metaphysics and the theories of meaning (semiotics).

The following quotation expresses the purpose of this study: "To the influence of the social sciences, of political economy, of business usage in the development of law, we must add the influence of philosophy. I am speaking now, let it be recalled, not of a philosophy *of* law, not of a theory of the genesis of law, its growth, its end, its function, but of rules and concepts *within* the legal system, and the reaction of general theories of philosophy upon their form and content. The two subjects tend to coalesce." CARDOZO, THE GROWTH OF THE LAW (1924) 126.

they have upon the law in its various aspects. Since logicians on the one hand, and lawyers and jurisprudents, on the other, have their respective disagreements and divergent terminologies, a selection will be made with a view to giving the reader a fair sample of current views.

To most people who are not professional logicians logic means the rules of straight thinking. "Straight thinking" is the process of inquiry by which we extend the known to the initially unknown; from that which we are warranted in asserting we approach that which is initially doubtful, with the result that we reach a conclusion which is dependable because of its proved relation to the dependable initial materials of the inquiry, and in this sense is "true". Since lawyers and judges are continually engaged in trying to attain dependable conclusions with respect to problematic situations, it seems obvious that logic in this sense is essentially involved in the practical work of the law; and since the law is a consequence of this practical work, the law, as a set of authoritative norms of conduct, is the consequence of a logical process. Paradoxically, the use or usefulness of logic in relation to law has been (apparently) denied. Jurisprudence, as a general theory of law, embraces an examination of such controversies and an analysis of the relations of logic to law. These may be clarified by an understanding of the scope and limitations of logic.

Formal Logic

The scope and subject matter of logic are matters of dispute between logicians. The older treatises on logic, such as the "Port Royal Logic" of 1662 regarded logic as "the art of properly conducting one's reason in the knowledge of things," [2] that is, the art of straight thinking. At the other extreme is a recent treatise which treats logic as "the science that exhibits all the relationships permitting valid inference that hold between various propositions considered merely with respect to their form." [3] This latter kind of logic is *formal* logic. It deals with the rules of implication and other relations. It does not purport to tell people how they *ought* to think, any more than the law of gravitation purports to tell people that they ought not to jump out of windows. (In either case, the admonitory character of the form seems implicit.) By renouncing any claim to developing a practical guide of reasoning, this school of logicians withdraws into a realm of "validating forms" in which logical theory is developed in a way similar to the development of mathematics. Indeed, the foundation work in this field, Whitehead and Russell's *Principia Mathematica*,[4]

2. Eaton, General Logic (1931) 6. (Hereinafter cited Eaton.)
3. *Id.* at 8.
4. 1st ed., 3 vols., 1910-13; 2d ed., 1925-27.

includes a kind of super-mathematics, a theory of the validating forms and relations which are logically anterior to the developed branches of mathematics. Symbolic logic has extended the scope and variety of logical analysis beyond that attained by the older subject-predicate logic, the logic of the traditional forms of the syllogism.

What theoretical significance or practical value does symbolic logic have for the law? For more than a generation the law has been unfavorably compared with science, and the more critical legal scholars have lamented that the law did not possess intellectual instruments comparable to those of the natural sciences. Mathematical logic, with its comprehensive theory of validating forms of inference, may properly be said to have potential significance for the logical structure of legal reasoning. In a somewhat similar way one might have said in 1681 (with the singular prophetic vision of a man of 1941) that the newly discovered differential calculus had potential significance for the sciences of physics and chemistry of the twentieth century—a potentiality which has been fruitfully realized. The analogy has a seductive charm for the imaginative jurisprudent, but it is open to grave doubts which cannot be fully explored here.[5] As yet even mathematicians and natural scientists have not been greatly affected in their practical work by the development of mathematical logic. It seems unlikely at present that it will be used in the practical work of the law; it may, however, provide useful insights for the development of a general theory of law, that is, jurisprudence.

The shift from substance to relation as a basic concept was one of the most significant changes in the growth of modern philosophy. One can illustrate this change by the similar shift that occurred about two decades ago in legal analysis. A legal right, formerly regarded as a thing-in-itself (a creation of "substantive" law), was reduced by Hohfeld and others to a relation between a person, a right-holder, and a determinate person or determinate persons (*right in personam*), or a class of indeterminate persons (*right in rem*); and the latter (the determinate person or the indeterminate persons) were said to be under a *duty* to the right-holder. By definition, *A's* right against *B* implies *B's* duty to *A*. It may be significant that Hohfeld's basic article, presenting this analysis,[6] was published in the same year in which the final volume of Whitehead and Russell's foundation work was published.[7] To say that these events were causally related because relativity or re-

5. *Cf.* CAIRNS, THE THEORY OF LEGAL SCIENCE (1941), which explores the theoretical possibilities of an empirical science of law.

6. Hohfeld, *Fundamental Legal Conceptions as Applied in Judicial Reasoning* (1913) 23 YALE L. J. 16. See also Pound, *Legal Rights* (1915) 26 INT. J. ETHICS 92. The work of Professors Walter Wheeler Cook, Arthur L. Corbin and Albert Kocourek, among others, further developed the analysis of legal relations.

7. Note 4 *supra.*

lationalism was "in the air" during the early decades of the present century, may be to conjure a Platonic ghost out of a metaphysical coincidence. A sounder basis for showing the significance of these events is to examine the refinements which mathematical logic introduced into the analysis of logical relations.

One such refinement (or invention) was the notion of a transitive relation.[8] An example is the one indicated by such an expression as "being greater than". This relation validates the following kind of argument:

John is older than James.
James is older than William.
Therefore, John is older than William.

This is not a syllogism (in the older tradition of logic) because it involves more than three distinct terms: "John", "older than James", "James", "older than William" and "William". It cannot be reduced to the categorical syllogism of traditional logic which has only three distinct terms: major, middle and minor:

All men (middle) are mortal (major).
Socrates (minor) is a man.
Therefore, Socrates is mortal.

The relation of Socrates to the class, man, is that of *class membership,* an intransitive relation. The validation of the "older than" argument, above, depends upon a transitive relation, "being older than".[9] The relation of *class-inclusion*—that is, the relation between two classes, A and B, such that one is included in the other—is a transitive relation which is fundamental in the development of the "calculus of classes".[10] The assumptions of this calculus delimit a universe of discourse within which the operations upon classes conform to stated principles. In the classification of law, the overlappings and lack of logical coherence may be ascribed in part to the circumstance that such dichotomies as "substantive" and "adjective", "public" and "private", lie in different universes of discourse.

The argument based upon transitivity is sometimes called by logicians, the argument *a fortiori.*[11] Lawyers have long employed arguments which they have called, *"a fortiori".* Are the two similar or identical? Does the logician's analysis throw any light on the

8. Generally: if a $>$ b (a is greater than b) and b $>$ c and c $>$ d, then a $>$ d. See COHEN AND NAGEL, AN INTRODUCTION TO LOGIC AND SCIENTIFIC METHOD (1936) 116. (Hereinafter cited COHEN AND NAGEL.)

9. EATON, 221; COHEN AND NAGEL, 49.

10. COHEN AND NAGEL, 121-126, give a brief treatment of the principles and symbolic terminology.

11. EATON, 220-222; COHEN AND NAGEL, 116.

lawyer's argument? A collection of specimens of the lawyer's argument *a fortiori* would probably reveal several logically distinguishable varieties. One such specimen depends upon the proposition that people are more important than property, that an individual's interest in his person is more valuable than his interest in his property. In one case it was argued by the court that since a child in embryo is capable of having legal rights with respect to (injuries to) his property, he must therefore be capable of having legal rights with respect to (injuries to) his person.[12] In another case the court argued that since *A's* promise to recompense *B* for *B's* (unrequested) services in having saved *A's* property is legally enforceable on the ground of *A's* moral obligation to *B*, then *A's* promise to recompense *B* for having, in a sudden emergency, saved *B's* life, is also enforceable on the ground of *A's* moral obligation to *B*.[13] In each case the conclusion drawn from the comparison of values is that the more valuable interest should be and is legally protected if the less valuable one is. The argument in the unborn-child case may be stated thus:

> If the law protects one kind of interest (of an unborn child) and if another kind of interest (of an unborn child) is more valuable, then the law protects also the other kind of interest.
>
> The law protects the property interest (of an unborn child) and the interest (of an unborn child) in the person is more valuable than the property interest.
>
> Therefore, the law protects the interest (of an unborn child) in the person.

The form of this argument is syllogistic:

> P^1 and P^2 imply Q.
>
> P^1 and P^2 are true.
>
> Therefore, Q is true.

This argument does not employ the full potentiality of the transitive relation, since it involves a comparison of only two classes of things: Property-interests and person-interests. In this it is unlike the argument, set forth above, involving a comparison of John, James and

12. Thomas, J., in Nugent v. Brooklyn Heights Ry., 154 App. Div. 667, 668, 139 N. Y. Supp. 367, 369 (2d Dep't 1913): "The being that owns is the supreme consideration and has capacity for ownership. What is owned and the right to own are merely incidental to the living entity. And yet, shall the incidents be valued in legal cognizance and the owner not?" (Citing precedents which recognized the capacity of the unborn child to have property rights.)

13. Webb v. McGowin, 27 Ala. App. 82, 168 So. 196 (1935). After referring to a precedent in which a promise to recompense another for saving the promisor's bull was held enforceable, the court (Bricken, P. J.) said: "On the same principle, had the promisee saved the promisor's life or his body from grievous harm, his subsequent promise to pay for the services rendered would have been valid. *Such service would have been far more material than caring for his bull.*" (Italics supplied.)

William. If one were to construct an argument introducing a comparison with a third type of interest, such as an individual's interest in his minor child (an interest not in fact attributable to a child in embyro!), one could present the following argument:

> *A's* interest in his minor child is more valuable than his property interest.
>
> *A's* interest in his person is more valuable than his interest in his minor child.
>
> Therefore, *A's* interest in his person is more valuable than his property interest.

It seems highly improbable that this type of argument can be found in any legal context, or at least in any judicial opinion, because the comparison of the most and the least valuable interest can be made directly without the intervention of the intermediate value. Moreover, the comparison of *classes* of interests is at best an argument, "in general", or "other things being equal"; for obviously some invasions of personal interests (*e. g.,* being touched in a crowd) are less harmful than some invasions of one's property interest (*e. g.,* having one's home destroyed). In short, the logical tool is available but the legal argument does not call for the degree of refinement which it involves. This one illustration does not, of course, prove that the refinements of symbolic logic have no possible exemplifications in legal argument; it merely shows how an exploration of this problem might proceed.[14]

Symbolic logic may, however, suggest some new insights into legal problems. For instance, the notion that two or more things may be compared without being otherwise measurable [15] suggests the answer to the question sometimes raised, How can one "balance" interests unless one has a scale in which to *weigh* interests? [16] Moreover, it suggests that one should look for other instances in the law of a comparison of values. Aside from the type of comparison between classes (property-interest less valuable than person-interest) which is used in the assemblage or organizing stage of legal reasoning ("finding the law"), one finds examples of comparison of particular values in the adjudicating stage ("applying the law"). Such examples occur most

14. Since Professor Morris R. Cohen, in 1916, made the suggestion that modern logic is better adapted to deal with a changing system, such as that of law, no applications of this suggestion have, as far as I know, been made. Cohen, *The Place of Logic in the Law* (1916) 29 HARV. L. REV. 622, 636, excerpted in HALL, READINGS IN JURISPRUDENCE (1938) (hereinafter cited as HALL) 369, 378. Professor Cohen's article, which discusses types of order in the law, gives logic a somewhat broader scope than does the present article.

15. See PERRY, GENERAL THEORY OF VALUE (1926) 636-637.

16. *E. g.,* M. Lepaulle's criticism of Dean Pound's "balancing of interests" theory. Lepaulle, *The Function of Comparative Law* (1922) 35 HARV. L. REV. 838, 844.

frequently in those reaches of legal doctrine which are called "equitable" or "discretionary". Thus, one question which aroused a good deal of discussion a generation ago was, Can a court of equity refuse to enjoin *B* from infringing upon *A's* property right (*e. g.*, damming a stream below *A's* land) if the harm to *B* from granting the injunction would be far greater than the harm to *A* from not granting it?[17] The English courts generally refused to apply the doctrine of comparative injury, on the ground that *A* was entitled to charge his price for permitting the invasion of his property right. The property rule assumes that land is always deemed "unique", and that the only question is whether or not *B's* acts fall within the class of acts which constitute invasion of property. The comparison of values (the relative harms of *B* and *A*) introduces a different type of logical relation. A similar comparison seems to be implicit in other growing points of the law, such as relief against conditions involving forfeiture,[18] and the enforcement of a promise inducing substantial reliance.[19] The distrust of such discretionary judicial powers by those who prefer "government by rule of law" is based on legal and political evaluations which cannot be gone into here. Still the difference in types of logical relation does seem significant.

Mathematical logic has been developed by the use of an abstract symbolism similar to that of algebra. This kind of symbolism has been employed in the statement or analysis of legal propositions.[20] One need not, however, be a symbolic logician to use legal shorthand. Yet it has some difficulties and dangers which need to be borne in mind. Suppose one states the simple proposition, "An offer and an acceptance and a consideration make a contract", in the form

$$O.A.C.\rightarrow K.$$

One must not take "and" (.) to mean "plus", nor "implies" ($\rightarrow$) to mean "equals". Nor must one take the converse proposition necessarily to be true: "Contract implies offer and acceptance and consideration". (A sealed agreement, without consideration, may be a contract.) Furthermore, the elusiveness of legal terms, their lack of precision, makes it difficult and risky to deduce conclusions by means of propositions taken from various contexts. One could not safely generalize

17. For a brief summary, see Note (1913) 13 COL. L. REV. 635. For a full collection of authorities, see CHAFEE, CASES ON EQUITABLE RELIEF AGAINST TORTS (1924) 281 *et seq.*

18. *Cf.* RESTATEMENT, CONTRACTS (1932) § 302 ("will involve extreme forfeiture or penalty").

19. *Cf. id.* § 90 ("if injustice can be avoided only by enforcement . . .").

20. MICHAEL AND ADLER, THE NATURE OF JUDICIAL PROOF (privately printed, 1931) is the most thorough-going example of the use of symbolic formulations of legal propositions with which I am familiar.

about "contract", without noting that it sometimes implies "promise", sometimes "conveyance", sometimes a corporation charter, and sometimes only a form of procedure (*e. g.,* "contract" actions in Massachusetts). The use of symbolic formulations by legal scholars (one can hardly look forward to the time when it will be used in instructions to juries or in judicial opinions) may, however, serve to clear away some of the terminological rubbish which accumulates with every generation of lawyers. Though the juristic heaven in which every legal term has a single and fixed meaning is only a mirage, we need not despair of introducing a better kind of orderliness into the law. The *Restatement of the Law,* while not formulated in abstract symbols, has its chief value in providing a more stable terminology than is commonly found in legal literature.

Symbolic logic, as the foundation of mathematics, as "pure" logic, is thus aloof from the "applied logic" of legal arguments. The relation between logic (formal) and logical reasoning is, as has been indicated, a subject of disagreement even among logicians. The men of law have been influenced variously by this problematic relation. It seems to be (or to have been) a common assumption that logic is the chief stabilizing bulwark of the law. As a groove of procedure or a testing device, in short, as a procedure of thinking, logic may still be regarded as a stabilizing device in law. This was not, however, the way in which it was thought of by an older generation of lawyers and judges. Logic has at times been thought to include a guaranty of two things: First, that self-evident or *a priori* principles could be discovered and used deductively to formulate legal rules;[21] and secondly, that a well formulated legal rule would leave the judge no discretion in applying "the law". The former guaranty finds some support among philosophers, beginning with Aristotle's occasional fusion or confusion of logic and metaphysics; immediately it comes to us from the eighteenth century, as is evidenced by the "self-evident truths" of the Declaration of Independence. Mathematical logic has cleanly severed logic from metaphysics, in that it recognizes no "self-evident" truths save its own axioms or postulates. Formal logic does not deal with the material truth of the propositions on which logical operations are performed. Applied logic is "if-then", or postulational thinking.[22] The logical props have been knocked out from under self-evident truths or principles and they have been relegated to some other realm of subsistence. (This does not dispose of them entirely, for the question

21. See Dewey, *Nature and Reason in Law,* in PHILOSOPHY AND CIVILIZATION (1931) 166-172, reprinted in HALL, 229-234. Some theory of natural law, or metaphysics, was usually conjoined with logic. See note 23 *infra.*

22. KEYSER, THINKING ABOUT THINKING (1926) c. II.

remains, whence do we get our propositions, and why do we believe in them?)

The second supposed guaranty of logic, that legal rules could be so formulated in terms having fixed meanings as to leave no discretion to the judge, was likewise supported by ontological theories associated with the older formal logic; its immediate source was Jeremy Bentham, who was certainly no formal logician.[23] The latter guaranty was sometimes taken by lawyers to mean that the law is now fixed and certain in application;[24] it was more often taken as an admonition to strive for legal certainty. Thus, Holmes, a leader in American legal realism, said "certainty *generally* is illusion";[25] he did not say that a workable certainty was unattainable with respect to *some* of the operations undertaken pursuant to legal rules. It may fairly be said, that the attack of the "free-law" school on logic in general was primarily an attack on the "bad logic" of lawyers,[26] that is, on the assumption of lawyers that logic could assure the material correctness or justification of conclusions reached by logical procedures.

The illusion of certainty has been dispelled, but the longing for it continues. It is, as Holmes said, "in every human mind" [27]—including his own. What can logic contribute to the satisfaction of this longing? If the longing is more than a day-dream, it must find its satisfaction in the reasoning process, what Professor Dewey calls "reflective inquiry", of the lawmen who work in and with the law. Not all the men of law engage professionally in the same process. The counsellor's process is materially different from that of the advocate or of the judge; and the process of the legal scholar or author or law teacher is different from these and from that of the legislator. These processes may be divided roughly into two stages: The assembling or organizing (part of the) process, by which the available legal materials are as-

23. On both of these so-called guaranties of logic, see the excellent analysis of a philosopher: Cohen, *The Process of Judicial Legislation*, in LAW AND THE SOCIAL ORDER (1933) 112-147. "The formalistic position is very likely to provoke a reaction that contributes to strengthening the theory of fixed *a priori* schemes of value, known by direct rational intuition." DEWEY, LOGIC: THE THEORY OF INQUIRY (1938) 510. Of course, formal logic, as at present generally understood (*e. g.*, EATON or COHEN AND NAGEL) does not include either of these so-called guaranties. On Bentham's position, see, for example, THE THEORY OF LEGISLATION (C. K. Ogden ed., 1931) 155.

24. See, for example, Cardozo's statement that, as a practicing lawyer, he often wondered why courts did not follow pertinent authority "inexorably to the limit of its logic". CARDOZO, THE GROWTH OF THE LAW (1924) 57.

25. "The language of judicial decision is mainly the language of logic. And the logical method and form flatter that longing for certainty and for repose which is in every human mind. But certainty generally is illusion, and repose is not the destiny of man." Holmes, *The Path of the Law* (1897) 10 HARV. L. REV. 457, 465, 466, COLLECTED LEGAL PAPERS (1920) 167, 181, reprinted in HALL, 670.

26. *See* Hoernlé, Book Review (Science of Legal Method) (1918) 31 HARV. L. REV. 807, 809, reprinted in HALL, 380, 381; GARLAN, LEGAL REALISM AND JUSTICE (1941) 9-10.

27. See the quotation note 25 *supra*.

sembled and organized for some present purpose or purposes; and the stage of application by which the assembled materials are applied to the facts of practical operation, such as the making of a decision on litigated facts, or the drafting of an instrument, etc. The former stands for the systemic aspect of the law; the latter stands for its particularization in judgment. This distinction resembles but does not imply the very old bifurcation between theory and practice; no sharp separation can be made except in the process.[28] Formal logic, as an implicit if not an explicit guide and testing device, has its place in both stages of the process, but its self-imposed limitations made it too narrow to account for important aspects of the reasoning process. Are not the logicians responsible in part for the "bad logic" of lawyers?

Induction and Probability

Reasoning from particular facts or instances to a generalization is commonly known as "induction". The place of induction in formal logic is a matter of dispute between logicians. "Induction" is sometimes used to mean the flash of insight, the intuitive perception of a generalization, which comes when the seemingly heterogeneous particulars of a problematic situation begin to line themselves up like soldiers on parade. Induction in this sense is beyond the confines of formal logic. The validating form of the inference from the particulars to the general is within the province of formal logic, and most formal logicians deal with induction as a special case of deduction. Suppose, for instance, that we want to estimate the number of motorists in the United States who have liability insurance, and we select the state of New York as a *typical* area for investigation. By investigating all the records of motor-car registrations in 1942 in New York we conclude that forty per cent. of the motorists in New York carry insurance; and from this we conclude that forty per cent. of all the motorists in the United States are insured. The deductive form of the argument is as follows:

> Whatever is true of the motorists of New York is true of all the motorists of the United States.
>
> Forty per cent. of the motorists of New York are insured.
>
> Therefore, forty per cent. of the motorists of the United States are insured.[29]

The deductive formulation of this inference calls our attention to the major premise, the sampling postulate. This proposition is not

28. The distinction corresponds roughly to Dean Pound's distinction between "finding the law" and "applying the law", but his "interpreting the law" seems to come in both stages. See Pound, An Introduction to the Philosophy of Law (1922) c. 3. Professor Cohen used Dean Pound's division in the article cited note 23 *supra*.

29. *Cf.* Cohen and Nagel, 276.

itself a deduction from any definition of "motorists", hence in a formal sense it is not "true"; it is merely "probable". The distinction made by a formal logician, "inductions are probability-inferences rather than truth-inferences",[30] seems to refer to the material content of the propositions, and thus to step outside the same author's definition of the scope of logic. The sampling postulate is necessarily based upon incomplete knowledge of the particulars about which we wish to generalize. Yet it need not be a pure guess. If we consider that the per capita wealth of New York residents is higher than in the rest of the country, so that they can better afford insurance; and if we consider also that in 1942 a New York law not found in other states made it compulsory for motorists to carry insurance in certain cases, we may well doubt the reliability of our sampling postulate. If we wish to extend our conclusion to include all *future* motorists in the United States, we must extend our sampling postulate similarly, and its reliability becomes more doubtful. Deductive formulation is thus a means of making us aware of the uncertainties of our reasoning.

The term, "induction", is also used to include the case of *perfect* induction, which is a generalization based upon *all* cases which its terms comprehend.[31] Thus, if the statement made above, "forty per cent. of the motorists of New York are, on (date), insured", is verified by a complete enumeration of all the motorists, insured and uninsured, on that date, it is a perfect induction. The kind of inductions people ordinarily want to make is the imperfect induction, which is verified only by a sampling of the particulars.

Theories of probability may be divided into the "frequency" theory and the "logical" theory. The former treats probability as a quantity, ordinarily denoted as ranging in value from 0 to 1, indicating the relative frequency with which a certain type of particular occurs in a specified class of particulars. The conclusions drawn from mortality tables make use of this theory, which has a mathematical structure. The logical theory of probability, chiefly developed by Keynes, treats probability as a unique logical relation, analogous to the relation of deducibility between propositions. Thus, if we say, "it has not rained for a week, and the barometer is falling, hence it will probably rain tomorrow", the relation between the first two statements (premise) and the conclusion is a probability relation, although we cannot determine quantitatively from this evidence the *degree* of probability that it will rain tomorrow.[32] In a looser sense, "probability" means degree

30. EATON, 70. Compare the same author's definition of logic, cited note 3 *supra*.

31. See EATON, 486-487; COHEN AND NAGEL, 275-276.

32. Nagel, *Principles of the Theory of Probability* in I INTERNATIONAL ENCYCLOPEDIA OF UNIFIED SCIENCE, No. 6 (1939) 17-19, 44, 48.

of conviction or expectation, and to say that a thing is "probable" means that it is more probable than not.

The frequency theory of probability is applicable to certain special problems in law, such as the valuation of an estate in land for the duration of a life and some problems of life insurance. Yet when one says that "the law deals with probabilities, not certainties", one refers to the non-frequency type of probable inferences. The meaning of the statement quoted is shown by three important uses of induction in the reasoning processes of the law: In judicial proof; in the theory of precedents; and in the teleology of law making.

In judicial proof, problems as to the trustworthiness of testimony gave rise to rules, in Greek and Roman law, designed to safeguard the adequacy of proof,[33] and the modern law of evidence has similar safeguards. The term, "circumstantial evidence", used to denote a particular kind of probability-inference in judicial trials, betrays a failure to recognize that all evidence, even the testimony of eye-witnesses, leads only to a probable inference. The logical analysis of probability will serve to remove such misconceptions.

The process by which a judicial precedent or a series of precedents may be made to yield a generalization, a proposition of law which rests upon the authority of precedent, is a baffling subject for logical analysis. A few of its logical aspects may here be indicated. First, the usual form of statement of "the law" in practical treatises or encyclopedias is a summary or perfect induction, such as:

> The law in most of the United States, as in England, has rejected the principle of moral consideration. . . .[34]

Such a statement is an historical statement, a summation of judicial precedents which are or can be fully listed in support of it. It might be objected that such terms as "rejected" and "principle of moral consideration", are open to different interpretations, and hence the statement is one of opinion rather than of fact. The same may be said of any perfect induction, such as "all Presidents of the United States have been Protestants".[35] The above statement as to moral consideration does not *purport* to state what principle American courts *will* accept or reject. Yet clearly, as Holmes pointed out, the professional use of such statements involves a prediction as to what courts *will* decide, or at least as to the grounds on which they will justify their decisions:

33. *Id.* at 6.

34. I WILLISTON, CONTRACTS (rev. ed. Williston and Thompson, 1936) § 148.

35. COHEN AND NAGEL, 276, use this example of a "perfect induction". Were Lincoln and Taft "Protestants"?

"The prophecies of what the courts will do in fact, and nothing more pretentious, are what I mean by the law." [36]

The prediction theory of law, widely accepted by American legal scholars, raises many questions which cannot be fully examined here. The logician's analysis of induction and probability will help in clarifying some of these questions. The prediction of a future decision from past authoritative precedents is not an application of the frequency theory of probability as understood, for instance, in the case of mortality tables, because the number of precedents is usually small and is not taken as the exclusive measure of the probability of the prediction. Yet the number of precedents of a particular type (*e. g.,* all the cases in New York upholding the requirement of consideration for unsealed agreements) does have probability significance, so that the "logical" theory of probability is not an adequate explanation.[37] Furthermore, the point has been made that a judicial precedent is not just an event (a decision) but is an event accompanied by its own interpretation, *i. e.,* the opinion of the court.[38] For this reason (among others) a probability-inference may be drawn from a single precedent. Such an inference is accounted for by the Keynes theory, which presupposes a "logical intuition" of the probable relations between propositions.[39] The "logical intuition" of the experienced counselor is an expert's hunch. Inductive inference, the pride of the experimental scientist, is the despair of the (formal) logician.

But the question is not whether inductive inference depends in some way upon an expert intuition or hunch; rather the question is, are there any logical controls or tests of the expertness of hunching? In the law, and in the experimental sciences, the systemic reference of the particular(s) is, I submit, such a logical control. An experiment in a developed science is not *just an isolated* particular event; it is planned and set up on certain assumptions with a problematic hypothesis which has logical relations to other propositions of the science. So a judicial decision, viewed as an event having greater or less probability,

36. Holmes, *loc. cit. supra* note 25.

37. Professor Nagel suggests that the "logical" theory of probability may be logically reducible to the frequency theory. *Op. cit. supra* note 32, at 18. The number of instances observed affects the assurance of comprehensiveness and variety of the characteristics which are likely to be found significant.

38. *E. g.,* Kelsen, *The Pure Theory of Law* (1934) 50 L. Q. REV. 474, 478, reprinted HALL, 425, 427. Even a trial court decision (judgment) without an opinion carries its interpretation in the pleadings and evidence of the case. I here use the term "precedent" to include the decision and opinion and, if permissible under the authoritative precedent theory, the record of pleadings and judgment.—Dr. Kelsen's distinction is not as sharp as he makes it, for reasons indicated in the next paragraph. See DEWEY, *op. cit. supra* note 23, at 509.

39. See NAGEL, *op. cit. supra* note 32, at 49-50. Professor Nagel regards such a Keynes inference as not germane to "scientific inquiry".

may be [40] set up (by pleadings and evidence) to test some problematic legal hypothesis which is either a contradiction (usually by way of exception) or a supplementation or a confirmation of some legal proposition in the system. Induction within a system yields a generalization having "scientific value". The number of instances (often a relatively minor factor, *e. g.,* repetitious holdings of intermediate courts following a single higher court holding); the variety and independence of the verifiable consequences of the generalization (*e. g.,* does it "explain" other groups of precedents); the precision of measurement and definition of the particular cases (in law this seems a semantic test); and the extent to which it (the conjectural conclusion) brings deductive unity into the system: These criteria of "scientific value" [41] seem applicable to the process of "finding the law". The method thus suggested is available to the judge; it is not confined, as the prediction theory was in its original context, to the counselor's prediction. It accounts in *logical* terms for the probability inference that a certain proposition of law is supported by authority in a certain jurisdiction. It does not take account of all the factors (*e. g.,* ethical, administrative and political values) which are influential in the process (or processes) of assembling and applying law. Later it will be suggested that the same process of systemic reference is useful and used in evaluating a proposed legal change.[42]

The use of induction and its results, probability-inferences, in the teleology of law-making presupposes a teleologic theory of legal-evaluative (ethical) judgments. While such a theory is beyond the scope of this article, it may be pointed out that most philosophies of law, (*e. g.,* those which state that the end of law is the greatest happiness of the greatest number, or the common good) accept some version of the teleologic theory. The use of probability-inferences in statute-making is well known. Indeed, the common law canon that a statute is to be so construed as to limit its scope to the immediate evil which it was designed to remedy is a tacit recognition of this phase of the legislative process. Statistical summaries and inferences have been strikingly used in the twentieth century legislating-process. Statistics-mania and statistics-phobia have each had their victims. It may well be pointed out that although statistics (and other types of fact-sampling) may premise probability-inferences as to the consequences of not making a new law, they are ordinarily less reliable as bases for two other types of inference called for in the evaluative process of law-

40. As in a "test case". Of course, litigation has other important functions than that of determining the law.

41. EATON, 69.

42. Page 891 *infra.* A simpler explanation of the logical aspect of the use of precedents is analogy, which is discussed briefly page 903 *infra.*

making, namely, the judgment as to the favorable consequences of a proposed law if enacted, and the judgment as to the cost of the new law, its unfavorable consequences.[43]

To go further and argue that because the judgment as to "favorableness" or "unfavorableness" of consequences cannot be settled by fact-investigations, therefore legal-evaluative judgments are independent of factual inferences, is to ignore an indispensable phase of the total process. To say that "what is" and "what ought to be" are inextricably intertwined is to perpetuate an ancient confusion. A good deal of the frustration and friction in contemporary discussions of social, political and legal questions is due to a failure to recognize when the respective protagonists are arguing about a probability-inference and when they are arguing about alternative modes of action which depend upon the conclusions of such inferences. Though inference and evaluation cannot be wholly separated (*e. g.,* in a time-sequence, or in division of labor), they can be distinguished usefully in the total process of reaching an evaluative conclusion.

That inferences as to the consequences of a judicial decision play a part in the judicial process can be shown, though less readily. For example, Cardozo the legal philosopher inferred that a rule holding the motor-car manufacturer responsible to the ultimate buyer (in case of negligence) would not upset the expectations of manufacturers who had relied on the contrary rule,[44] though Cardozo the judge did not mention this inference in his opinion.[45] Whether it should be so or not, the reasons given for a judicial decision do not reveal the whole of the reasoning process.

Instrumental Logic

A broader conception of the scope and subject matter of logic, begun by John Stuart Mill, has developed during the past sixty years, into pragmatic or instrumental logic. The origin of a pragmatic theory of logic may be ascribed to Charles S. Peirce, whose essay on *How to Make Our Ideas Clear* was first published in 1878. The present position of instrumental logic is best represented by Professor John Dewey's treatise, *Logic: The Theory of Inquiry,* published in 1938. Instrumental logic is an account of the whole process of reflective in-

43. *E. g.,* Professor Cohen's example, the inference of expert economists that the cost of workmen's compensation would be shifted by the employer to the consumer. Law and the Social Order (1933) 141. A more recent example of expert prediction of the consequences of projected legislation is found in Henderson, *Science, Law and Alcohol* (1933) 167 Harper's Magazine 46, reprinted in part, Hall, 1060-1068.

44. Cardozo, The Nature of the Judicial Process (1921) 145-146.

45. MacPherson v. Buick Motor Co., 217 N. Y. 382, 111 N. E. 1050 (1916). It is not difficult to find inferences as to the probable consequences of statutes in judicial opinions on the constitutionality of the statutes. Ordinary "common law" opinions seem to be different in this respect.

quiry, of "reasoning", designed to explain the methods employed and to provide guidance for the attainment of the best results. It thus embraces subject matter which formal logicians assign to the domain of methodology or psychology. Refusing to separate logic wholly from the content and meaning of the propositions of reflective inquiry, the instrumental logician is concerned with the method of knowledge and the guidance of inference toward knowledge; and he cannot escape the difficulty of drawing a line between the methodology that belongs to instrumental logic and the methodology that belongs to a particular practical discipline, such as law.

The essential features of instrumental logic seem to be:

1. Logic is chiefly concerned with problematic (that is, genuinely doubtful) situations, rather than routine or stereotyped ways of acting. As an English writer put it, "the central subject of logic is the risks of reasoning".[46] Men do not need to reason very hard or very long about a great many decisions which they make, whether in ordinary affairs or in the practice of an expert discipline such as law or experimental physics. When does a situation become problematic? Whenever someone questions a routine conclusion, or the situation is such (or is claimed to be such) that routine methods do not give any (or any satisfactory) conclusion. Instrumental logic treats reflective inquiry as operating in a cultural matrix which gives rise to problematic situations and provides the materials for their successful termination. Litigation is an example of one way in which the need for reflective inquiry is evoked. It is also evoked when the expert counselor projects in imagination the possible and probable consequences of a contract or a will which he is engaged in drafting. The basic approach of instrumental logic is thus congenial to law, especially to a system of case law.

2. Instrumental logic de-emphasizes the comprehensiveness and reliability of pre-existing knowledge and emphasizes the creative function of reflective inquiry in producing new knowledge. The propositions of pre-existing knowledge are taken to be known not absolutely but as only "warrantably assertible". They were derived from processes of inquiry which may have had in view other conditions than those now presented, and which in any event could produce conclusions no more reliable than the materials on which they were based. To attain the best conclusions about a problematic situation one should utilize all reliable and relevant pre-existing conclusions (knowledge) about it; but one's new conclusions are not mere stereotyped replicas of the pre-existing knowledge; something is added in the process. The implications of this position for law are numerous. For one thing, it denies

46. SIDGWICK, ELEMENTARY LOGIC (1914) 170.

that judicial decisions by the "blind hunch" method will in the long run produce as good results as those which are preceded by reflective inquiry, weighing of alternatives, reasoning. Again, the old question, *Do* courts make law?, is to be answered in the affirmative, in the sense that each new decision, in so far as it has significance as a precedent, adds something to the meaning and content of the propositions on which it is based. Thus every decision of a court of last resort which applies the legal concept of consideration to its stated facts, whether by including or excluding those facts, adds something to the meaning (as well as to the authority) of the legal requirement of consideration. Thirdly, the de-emphasis of pre-existing conclusions (propositions) is exemplified in the abandonment of what Dean Pound has called the greatest fiction of modern law, the fiction that judges merely "find" the law [47] which is uniquely and inexorably controlling. If it be recognized that "finding the law" involves a choice among possible premises, more or less circumscribed but none the less real, the differences between the majority and minority of a court on a crucial case can be better understood than if one assumes that one side or the other has merely failed to do its sums aright.

3. Instrumental logic does not ignore the systemic aspects of a developed body of knowledge or conclusions. Between the work of Peirce and that of Dewey intervened the work of William James in gaining public recognition for pragmatism. Some of James' popular lectures are open to the interpretation that pragmatism is a theory of methodology only for common-sense conclusions, that is, those which are not derived from a systematic accumulation of pre-existing guides. James' own work in the technical field of psychology refutes any such conclusion. Instrumental logic takes account of the systematic consequences of a body of specialized knowledge such as law. A legal term has no meaning (or only a loose and popular meaning) in isolation; it gains clarity through its relation to a code or constellation of related meanings; and the legal code is a "scientific" rather than a "common sense" code to the extent that the meanings of its terms are expressly determined in their relations to other members of the language system.[48] The development of concepts and propositions of increasing inclusiveness—a hierarchic system—is useful to the extent that it widens the range of inference from principles to decisions.[49] Thirdly, the process of searching for and choosing propositions which can serve as guides or justifications of a decision is checked and limited by the requirement

47. POUND, *loc. cit. supra* note 28.
48. DEWEY, *op. cit. supra* note 23, at 45-50.
49. *Id.* at 294.

that the propositions chosen should be "compossible" with the established propositions of the system.[50]

In the process of judicial decision (and in the auxiliary and dependent processes of the counselor and the advocate) this limitation operates chiefly in two ways: It limits the comprehensiveness of the generalization for which a prior precedent or precedents may be taken as authority; and it limits the invention of new propositions which will serve either as guides or justifications of the presently litigated case. An example of the former is the struggle over the recognition of promissory estoppel as a new type of informal contract without consideration. In some legal systems, especially those states which provided a tight articulation of the bargain concept of consideration, the innovation was rejected, or was confined to some narrow parameter such as charitable subscriptions. In other legal systems (*i. e.,* states) the innovation was more readily accepted because the concept of consideration was more loosely formulated. Or take the late Professor Oliphant's example of the precedent significance to be ascribed to a decision denying recovery of damages by a fiancé against the girl's father for his inducing the girl to break her engagement. Such a decision might be taken to support a legal proposition that all parents are privileged to induce breach of promises to marry, by either daughters or sons; it would not be taken to indicate that all persons are privileged to induce all other persons to break all contracts,[51] for that would contradict the rule long established by other precedents. This limitation, which is logical in form (though it involves evaluative judgments), accounts for the practical "presumption against wide principles of law".[52] It also accounts for the inveterate practices of judges in trying to tuck an innovation into some accepted formula—a process which is all the easier because the legal mansion contains many non-Procrustean beds. A similar requirement (or perhaps "presumption") of compossibility operates in the interpretation of experimental results in natural science [53] but with less inclination and less opportunity to conceal innovations.

To use a homely metaphor, a court should always ask itself honestly, how many apple-carts will be upset if we give a decision thus-

50. DEWEY, THE QUEST FOR CERTAINTY (1929) 160. "Compossibility" does not mean formal consistency; it means compatibility in operation..

51. Oliphant, *A Return to Stare Decisis* (1928) 14 A. B. A. J. 71, reprinted HALL, 580. Neither this essay, nor Professor Goodhart's (see note 52 *infra*) takes sufficient account of the the systemic significance of a precedent. Professor Beale, on the other hand, emphasizes the systemic unity of the law to the point of exaggeration. See I BEALE, A TREATISE ON THE CONFLICT OF LAWS (1935) §§ 3.4, 4.12, reprinted HALL, 410.

52. Goodhart, *Determining the Ratio Decidendi of a Case* (1930) 40 YALE L. J. 161, 178, excerpted in HALL, 584.

53. See the account of induction fitted into a system in EATON, 69.

and-so, with its accompanying explanation (opinion) and probable implications? One boundary of the judicial function is determined by the answers to such questions. Of course instrumental logic does not assume that this question is always answered honestly; a judge who is clever enough can often make his conclusions *appear* to be compatible with any system. Nor does it assume that honest compatibility with established principles is always indispensable to a wise decision; the law has been not only changed but also improved through the acceptance of innovations which were originally contradictory of *some* established principles.

Where does the law get its established principles? Or, to avoid the possible confusion of the metaphor, how does the lawman determine what *are* established principles? Certainly not by reducing the propositions of the law, with which he has to deal, to a Euclidean system of axioms, postulates and theorems. No authoritative body of law is, I think, susceptible to such reduction. It is sometimes assumed, however, that certain principles or generalizations are necessarily *logically* superior or anterior to others because of the logical structure of the legal system. If the propositions of law were formulated as a logically perfect system, that system could, it seems, be logically converted into another equivalent system in which the axioms of the first system would become theorems or subordinate propositions of the second system.[54] The basicness or fundamentalness of a legal proposition is thus not determined by formal logic. That depends upon the comprehensiveness and fruitfulness of the proposition in question (which can be tested by logical procedures), by the variety and scope of the consequences which follow from it. Thus, the proposition that every legal right requires a legal person as a rightholder has a wide variety of authoritative consequences in nearly all parts of the law; and the widespread refusal of legal systems to recognize the legal personality of a child in embryo, as a rightholder, has been partly due, I think, to a reluctance to infringe upon this comprehensive postulate of the law. The basicness of a legal proposition is thus dependent upon its content and its consequences.

Instrumental logic includes a theory of knowledge which a formal logician excludes from logic and calls epistemology or psychology. The "selectors" with which the legal inquirer takes "facts" from or through his sense stimuli, and by which he shapes facts into the "operative facts" of the law, are derived not alone from his previous legal experience and from his legal education, but also from his total ex-

54. COHEN AND NAGEL, 142: ". . . there are no *intrinsically indemonstrable propositions.*"

perience and from his peculiar drives and preferences. No fixed legal categories or concepts can wholly isolate this process of selection and shaping; on the contrary, the influence of any inquirer's biological and social matrices is an inevitable limitation on the "purity" of his reasoning. Hence the total personality of the judge (or administrative adjudicator) can be a guaranty of good government no less than the quality of the laws which he seeks and purports to apply. An inquiry as to the prejudices, or ideals, of a prospective judge is thus no less relevant than an inquiry into his moral character or professional competence.

Hence, too, the truism that a lawyer will "size up" a situation differently from a layman; Mrs. Grundy on the witness stand will insist upon telling many details which the judge and the lawyers regard as trivial. The institution of a professional body of jurists (lawmen) who develop a systematic and technical body of standard propositions and concepts and skills which are communicated to, and ingrained in, its adherents, can be a guaranty of good government "by law". Instrumental logic, as an account of the process of legal reasoning, never ceases to warn us that on the one hand, the unspoken prejudices of the judge may be the decisive factor in judicial decisions, and that on the other hand, the selection of facts exclusively by the use of routine rules may leave out much that would be significant upon a more comprehensive view of the data of a decision. To say of the judicial process that "law is reason without desire" [55] is to state an admonition or ideal rather than a fact.

Logic as an Instrument of Control

That logic is or can be an instrument of control over the human passions and prejudices which are aroused in the making and administration of the law has been touched upon in the preceding pages. The common ground of both logic and law is the relation between propositions and between classes regarded as terms or potential terms of propositions. The making of statements of some sort is required for the most elementary of legal operations, such as a trial of a dispute in an informal "small-claims" court; even here, a realm of discourse is marked off by jurisdictional limitations and by the setting of the case. In legislation and in the reports of courts of appeal the use of propositions which are about something, which can be affirmed or denied, which have some guidance for conduct, is a part of the instrumentality of control. Because propositions are capable of contradiction (in whole or in part), because contradiction requires choice, because choice is

55. Aristotle, Politics, Book III, Ch. XVI.

better made when the consequences of the various alternatives are understood as fully as is possible, because propositions have logical antecedents and logical consequences which, by the act of judgment, become practical consequences, a rudimentary kind of logic seems to be implicit in government by law as we know it.

The interest of American legal realists has been centered about the judicial process. It may be asked, do judges *think* in syllogisms, and if they do not, should they? Of course "think" is ambiguous, and the question cannot be answered in logical terms. I prefer to believe, with Professor Dewey, that judicial decisions will, on the whole, be more reasonable if they are reasoned; that the imagined experimentation by which, given a problematic situation, a series of conjoined or alternative hypotheses is evolved from the facts of the situation and the law,[56] is the best way of testing judicial hunches. Logic as a testing instrument is a highly useful device even for those who do not know the principles or theory of the instrument. It is comforting to know that mathematics was a useful instrument long before mathematical logicians discovered its principles.

The giving of reasons in a formal opinion is a related yet somewhat distinct process. If the decision is well reasoned, some of the propositions which survive that experiment will ordinarily appear in the opinion. One who has read judicial opinions for many years does not need to be told that the judge's imagination is often not active enough (alternatives are ignored) or his formulations are not clean cut (he overgeneralizes or uses weasel words) or that his rejections are not ruthlessly made (inconsistent propositions are not clearly rejected or qualified). Moreover, the facts of a litigated case are seldom reducible to a simple syllogism, to a single decisive proposition of law, without doing violence to somebody's feelings of justice, or at least without abstracting so comprehensively as to make the propositions meaningless. If, for purposes of illustration, one states the reasoning of an opinion in the form of a syllogism (as I do occasionally in this article) one almost inevitably oversimplifies the case. The giving of multiple "reasons" for decisions is, however, not a proof that logical method is an irrelevant accident; it signifies rather the variety of relations which experience has shown to be relevant. A certain looseness in formulating judicial opinions is a part of the American judicial tradition. It signifies, for one thing, that the courts do not profess to "make law" in the fixed form in which legislatures make it. It signifies, too, a commendable caution in committing one's self to generalizations

56. Dewey, *Logical Method and Law* (1924) 10 CORN. L. Q. 17, reprinted in part, HALL, 343. See also Patterson, *Dewey's Philosophy of Law*, in THE PHILOSOPHER OF THE COMMON MAN (1940) 172-204.

of which one cannot foresee all the logical consequences in the limited time and with the limited energy available. It signifies often a compromise between conflicting views of different judges, who can be brought into line only by some concession to the "reasons" which they deem paramount. The looseness of judicial opinions also results, unfortunately, from the fact that the capacity for imaginative and accurate generalization is an intellectual gift which relatively few mortals possess. The conclusion indicated is that courts should write relatively fewer opinions, that these cases should be selected for their precedent-significance, and that the task of formulating the opinion should be entrusted to the judge or judges having the best logical talents—which are not necessarily accompanied by the best ethical insights or the best political wisdom.

The decision and its reasons constitute a precedent in the legal system. Even with the best of formulations, the precedent will require "interpretation" when the next case comes up. The next judge, or lawyer, will want to detect the implicit postulates [57] of the judicial reasoning of the precedent. The effort to avoid making the various parts of the opinion appear contradictory of each other is a deductive process; the effort to make the postulates detected subsume all the facts and yet be compatible with the (for the present) established propositions of the legal system, is an inductive-deductive process. When a lawyer or a judge can detect in a precedent "reasons", apparently decisive and yet unreconcilable with legal propositions that cannot be openly rejected (*e. g.*, the higher court thought the jury's verdict was wrong but could not justify ignoring it), the precedent loses a good deal of its authoritative significance. "Hard cases make bad law." With all of its wastefulness, its logical and aesthetic sloppiness, a case-law system does have the great merit of leading the process of legal inquiry back through the general propositions of opinions and of treatises to the "facts" of precedents, the propositions having immediate existential reference to the controversial situation which was resolved with the aid of the generalizations. A judge who, as his opinion indicates, has not "read the cases" but has merely relied upon the canned generalizations of an encyclopedia or a treatise has, as we generally recognize, neglected the creative work of the judicial function.

The logical procedure of applying fixed statutory language (statutes, regulations, ordinances) appears to be relatively simpler than that of applying case law. A well-drawn statute, even if categorical in form, can be reduced to an "if-then" proposition in which the "if" clause states the subject terms or factual antecedents and the "then"

57. KEYSER, THINKING ABOUT THINKING (1926) c. IV, "Detection of Postulates".

clause states the legal consequences prescribed. In the stage of formal logic, the relation between the "if" clause and the "then" clause is one of formal implication; the hypothetical syllogism is normative, admonitory or coercive if and because it has authoritative or persuasive influence to make the logical inference eventuate in a practical judgment. The conception of a logical "universe of discourse" in which propositions have implications considered apart from their present application by practical judgments is a bit of formalism distasteful to practical men of law;[58] and it can easily be exaggerated into a metaphysical conception which assigns an existential status to law in the abstract. Instrumental logic, with its own metaphysical assumptions, can assign law in discourse a useful place in the logical process. For example, the common practice by which an appellate court, on an important question of law, examines the precedents of other Anglo-American jurisdictions though for it they are not authoritative (a practice which has enriched American law as well as American law-book publishers) is an examination of logical consequences in a realm of discourse methodically separated, for the moment, from the authoritative pressure of official duty. Yet the separation must be only methodical and momentary, if the law is not to become a "brooding omnipresence in the sky". The assembling or organizing phase of the logical process may be conceived of in this way.

So the reduction of a statute, where a controversy worthy of legal talents arises (*i. e.*, aside from the simple routine judgments of statutory application which do not become controversial), to a series of conjunctive or disjunctive "if-then" propositions calls for a reconciliation of conflicting provisions, provisions which appear to be conflicting when applied to the controversial situation. The conflict between "common law" and "statute" appears at this point as a difference in logical method. The statutory proposition of law, unlike the case-law proposition, carries with it no logical antecedents in precedents; and a judge accustomed to a case-law method is troubled because he cannot use the logical method, pointed out above, of going back to the factual situation(s) from which the proposition was derived (in part). To the case-law mind the statute thus appears to be a kind of logical *filius nullius*. It is not surprising, then, that statutes in derogation of the common law (and what one was not?) were strictly construed, which meant ordinarily that the court sought for the immediate factual situation (like the facts of a judicial controversy) which the legislative proponents of the statute designed to remedy, and confined its

58. See, for instance, Mr. (now Judge) Jerome Frank's attack on "law in discourse" as a kind of Euclidian geometry in his article, *Mr. Justice Holmes and Non-Euclidean Legal Thinking* (1932) 17 CORN. L. Q. 568, reprinted in part, HALL, 365.

meaning to a generalization which subtended the immediate evil. Secondly, the statute is in fixed language. A judge who is accustomed to extracting the sense of a precedent by putting together the three or a dozen ways in which the precedent-judge expressed what was meant to be, more or less, the same proposition, is depressed by the logical arbitrariness, the monopolistic monism, of a statutory formula. Under these circumstances he can take the view that statutes are to be mechanically applied (a view now repudiated in jurisprudential circles but surviving, I suspect, in a good many judicial chambers); or he can say, with Cardozo, that it is within the judicial function "to infuse the statute with the glow of principle".[59] The logical process of statutory interpretation lacks the contextual anchors which precedent-situations give to the case-law process; the logic of formal implication is, of course, unchanged. At this point one can recognize that instrumental logic overlaps the domain of semantics, or the theory of meanings.

The Tautology of Logic

The foregoing account of the use and influence of logic in the law may be objected to on the ground that logic is a barren explication of tautologies and hence cannot account for the creative and vital procedures above summarized. "The life of the law has not been logic: it has been experience." [60] The argument that the statement of a formal implication is a tautological statement may be exemplified by the hypothetical syllogism:

> If all men are mortal and if Socrates is a man,
> then Socrates is mortal
> Socrates is a man.
> Therefore, Socrates is mortal.

The conclusion is tautological, it is said, in the sense that it adds nothing to what we know when we know the major premise. Or, to put it differently, we cannot safely assert the major premise about "all men" unless we know it is true of Socrates; and if we know that, we know the conclusion. Or, to take an example nearer home:

> A promise which the law will enforce is a contract.
> *D's* promise to *P* is a promise which the law will enforce.
> Therefore, *D's* promise to *P* is a contract.

59. Cardozo, The Nature of the Judicial Process (1921) 93, see also p. 83; Patterson, *Cardozo's Philosophy of Law* (1939) 88 U. of Pa. L. Rev. 71, 88.

60. Holmes, The Common Law (1881) 1.

Here the major premise may be taken as definitive,[61] a resolution to use the word contract in a certain way. As soon as we so define contract we necessarily include *D's* promise to *P*. And why be so tiresome as to say it over again?

Formal logicians have been sensitive to this argument about the utility of formal logic, and have answered it in various ways. One answer is that, while a theory has utility, this is its least fundamental value; the beauty of a logical structure, the satisfaction of intellectual curiosity, are the chief values of any theory, and so of formal logic.[62] That *elegantia juris* as an aesthetic value has influence upon some of the men of law can scarcely be denied; it is not, however, the justification here proposed. Another answer, requiring more careful analysis, may be summarized as follows: The argument of tautology states substantially that the conclusion of a syllogism lacks *psychological* novelty; this is not within the domain of formal logic, since a syllogism cannot have "logical novelty" and be a valid syllogism; on the other hand, the conclusion lacks psychological novelty only to a reader whose "conventional understanding" of the major premise clearly includes the conclusion; if his conventional understanding does not (psychologically) include the conclusion, the syllogism does not appear tautologous.[63] Any lawyer who has drafted statutes will recall the pained surprise with which he discovered that his statutory language included an unsuspected situation. Or let us go back to our definition of contract: Suppose the question is whether a promissory estoppel is a "tort" or a "contract". The definition provides the following argument:

> A promise which the law will enforce is a contract.
> A promissory estoppel is a promise which the law will enforce.
> Therefore, a promissory estoppel is a contract.

The conclusion here is not as obviously tautologous; the organizing function of the definition makes itself felt. If, for instance, the question is whether a cause of action based on promissory estoppel is governed by the statute of limitations as to "contracts" or that one governing "torts", the conventional definition of "contract" is an indication of the determination which lawyers, familiar with it, would

61. It is a simplified version of the definition of contract in RESTATEMENT, CONTRACTS (1932) § 1. Obviously the major premise is not a definition if "contract" also includes "*a set* of promises which the law will enforce", since a definition states a relation of equivalency, *i. e.*, the statement is true if the subject term and the predicate term are interchanged.

62. EATON, 578.

63. COHEN AND NAGEL, Ch. IX, § 1, "The Paradox of Inference", 173-176. Mathematical logic, with its conception of "material" implication and greater complexity, is less likely to be charged with psychological tautologism.

expect. A third type of answer to the argument of tautology is that not every universal proposition is a mere summation of previously known singular propositions;[64] for the function of a universal proposition (excluding a perfect induction) is to state, hypothetically or categorically, something about unknown cases.

What of the tautology of instrumental logic, the theory of logic which takes account of the whole reasoning process? Professor Dewey states two logical conditions which ordered discourse must satisfy: "The order of propositions must be *rigorous* and *productive*." The conceptions or meanings found in subsequent propositions are identical with those of antecedent propositions "in operational force not in *content* and hence lead rigorously to meanings having another content".[65] The introduction of "meaning" or "content" refers to the psychological meaning of tautology, and the requirement of productivity states that ordered discourse must lead us somewhere, to some conviction or judgment or operation. In a larger sense, the logical process of law may be called tautologous, in the loose sense that what comes out of it must somehow have gone into it—a useful axiom when we are hunting for a judge's implicit assumptions. Yet the product is no more tautologous with its antecedents, in instrumental terms, than the marble Galatea was tautologous with the block from which she was made.

Some Illustrations of Logical Argument

One cannot easily find, in judicial opinions or in other legal literature, examples of (formal) logical fallacies.[66] Perhaps if judges or other legal writers would try to formulate syllogisms, they would reveal their unfamiliarity with the rules of logic; even so, their reasoned discourse may conform to those rules. The errors ascribed to judicial opinions, or to other specimens of legal reasoning, are ordinarily not *formal* but *material*. A few illustrations will suffice to show what this means.

In *Merrill v. Hodson*[67] the plaintiff alleged that she ate sweetbreads served to her in defendant's restaurant, and was made ill; for this she sought to recover a judgment for damages. The plaintiff did not allege that defendant was negligent in serving her the tainted sweetbreads; her complaint alleged that the food was "sold" to her and that

64. Cohen and Nagel, 181.

65. Dewey, Logic: The Theory of Inquiry (1938) 314. (Italics in both quotations are in the original.)

66. See Treusch, *The Syllogism*, in Hall, 539, 558, for a few examples. On "immediate inference" (formal implication) and the varieties of the syllogism, with legal propositions used as illustrations, see Professor Clarence Morris' excellent little book, How Lawyers Think (1937) c. IV, V.

67. 88 Conn. 314, 91 Atl. 533 (1914).

its sale was attended with the implied warranty that it was wholesome and fit for consumption. The Uniform Sales Act, adopted in Connecticut, declared in effect that a "sale" of food for consumption constituted an implied warranty that it was fit for consumption. The appellate court set aside a verdict for plaintiff (for $6,500). In the opinion of the court the reason given was that this serving of food in a restaurant was not a "sale". The opinion has been criticised for not considering the proposition that a transaction other than a "sale" may constitute an implied warranty. In the light of this argument, the court's reasoning may be formulated thus:

> A sale of food for consumption is a warranty of fitness for consumption.
>
> No serving of food to a customer in a restaurant is a sale of food for consumption.
>
> Therefore, no serving of food to a customer in a restaurant is a warranty of fitness for consumption.

This argument is formally fallacious; the major term is used in a wider sense in the conclusion than in the premises.[68] The major premise does not purport on its face to be a "definition" of implied warranty, hence other transactions or circumstances might constitute (give rise to) an implied warranty; with respect to the major premise the proposition, "Some transactions which are not sales imply warranties" is indeterminate.

But is the court justified in asserting that, because the plaintiff's lawyer alleged that the transaction was a "sale", the issue before the court was limited to the question, "Was this transaction a sale?" If so, the court's reasoning may then be stated:

> If the serving of food by D to P was not a sale, then it did not imply a warranty of fitness.
>
> The serving of food by D to P was not a sale.
>
> Therefore, the serving of food by D to P did not imply a warranty of fitness.

This argument is formally valid. The first ("if-then") proposition states the legal issue in the case. It is open to the objection that, regardless of the legal proposition asserted by plaintiff's lawyer, the court *should* have considered (as it did not in the opinion) whether a serving of food to a customer, even though excluded from "sale",

68. See Treusch, *loc. cit. supra* note 66, at 549. On p. 550, Mr. Treusch gives as an example an argument substantially the same as the one given in the text, but taken from another case.

implied a warranty of fitness. The criticism is thus material, not formal. That the theory of law on which a case was tried and a judgment recovered was erroneous does not preclude the appellate court from affirming the judgment on some other theory of law which fits the facts. Yet there must be a limit to the work which appellate judges are obliged to do in supplying the deficiencies of the briefs of counsel. The Connecticut court was materially wrong, I think, but one cannot prove from the record that it committed a logical fallacy.

As another example let us take the reasoning of Mr. Justice Sutherland in the case of *Ribnik v. McBride.*[69] Among his reasons for holding unconstitutional (violation of "due process" clause of Fourteenth Amendment) a New Jersey statute which prescribed regulation of the prices charged by employment agencies was a prior decision of the same court holding unconstitutional a New York statute regulating the prices of theatre ticket agencies. Both agencies, he said, are "brokers". Suppose we formulate his reasoning syllogistically:

> (*Major premise:*) A statute regulating the prices charged by brokers is unconstitutional.
>
> (*Minor premise:*) A statute regulating the prices charged by employment agencies is a statute regulating the prices charged by brokers.
>
> (*Conclusion:*) Therefore, a statute regulating the prices charged by employment agencies is unconstitutional.

Mr. Justice Stone, dissenting, pointed out important differences, with respect to the need for price regulation, between theatre ticket agencies and employment agencies. To one who accepts his argument either the above major premise is wrong (the prior decision is not authority for a proposition about "brokers" generally) or the term "broker" has a different meaning in the major and in the minor. Neither of these defects is a formal defect; and from Mr. Justice Sutherland's opinion one can safely infer that he would not have altered his conclusion had the alleged ambiguity been pointed out to him. His reasoning was formally correct, given his premises and the meaning which he attached to them.

The art of persuasion and the logic of demonstration, while not incompatible, are not to be confused. Where the purpose of one's argument is to persuade another to accept a particular proposition (*i. e.,* plaintiff shall have judgment against defendant), many logical demonstrations can be formulated to validate the conclusion, and, as Holmes remarked, it is easier to criticize the reasons than the decision. The

69. 277 U. S. 350 (1928). The argument referred to is at pp. 356-357.

same is scarcely less true when the object of the argument is to persuade another to accept or to abandon a universal proposition. An example is the controversy between the late Professor Oliphant and Professor Williston, over the proposition that in a bilateral contract, both parties must be bound or neither is bound (the requirement of mutuality). Oliphant carefully formulated a series of syllogisms showing that the requirement of mutuality in bilateral contracts was not a necessary logical consequence of the requirement of consideration.[70] The demonstration did not lead Professor Williston to abandon his view that the requirement of mutuality was based upon both precedent and practical justice.[71] Although in his treatise he had stated that the mutuality rule was an "obvious consequence" of the rule requiring a consideration,[72] when confronted with Oliphant's careful exposition of the ways in which the consideration requirement could be formulated without including the mutuality requirement as a logical consequence, Professor Williston proceeded by *assuming* the mutuality requirement as a materially necessary principle and then showing that it *could* be harmonized with the "general principles of consideration".[73]

Professor Williston seems to have made the same mistake as Oliphant when, in a later work, he ascribes to rigorous logic a number of legal doctrines which were avowedly based on false analogies or on the assumption that some previously enunciated rule was applicable.[74] The demonstration that a man's explicit logical inference is faulty may lead to the desirable result of persuading him to enunciate the "real" reasons for believing in the conclusion. Even if the attack on a man's logical inference merely leads him to re-formulate one or both of his premises, or to re-define his terms, so that the same conclusion logically follows, yet the change may reveal his ultimate beliefs on which issue can be joined, or modes of adjustment can be found. If so, formal logic may be a useful instrument.

Three types of argument are well known favorites of the reasoning (or reason-giving) of judicial opinions: Analogy, *reductio ad absurdum,* and *a fortiori.* Of analogy two points may be noted. First, the perception of analogies may be based on a number of similar attri-

70. Oliphant, *Mutuality of Obligation in Bilateral Contracts at Law* (1925) 25 COL. L. REV. 705. This is one of the few legal articles in which syllogisms are extensively employed. The argument was concluded in (1928) 28 COL. L. REV. 997.

71. Williston, *The Effect of One Void Promise in a Bilateral Agreement* (1925) 25 COL. L. REV. 857, 858.

72. I WILLISTON, CONTRACTS (1920) § 103e.

73. Williston, *supra* note 71, at 858.

74. WILLISTON, SOME MODERN TENDENCIES IN THE LAW (1929) 15-23. Thus, the judges who held that a joint obligation belongs to the surviving obligee, by analogy to the rule applicable to a joint tenancy of land held under feudal tenure, might have remained of the same opinion even if the weakness of the analogy had been exposed.

butes of the things analogized and may be a "sound" analogy (that is, the attributes may be relevant to the legal consequences to be attached) and yet the formulation of an explicit generalization does not occur and would, indeed, be extremely difficult. This type of reasoning is sometimes called "pure analogy", because it exemplifies John Stuart Mill's contention that one can, and does frequently, reason from particular to particular without generalizing.[75] By such reasoning case law has been extended to new situations of such a character that if the court (especially a trial court) which had the case of first impression for such extension had been compelled to formulate a generalization justifying the extension, it might not have made the extension, or it might have made its formulation ineptly. Examples may be found in the successive extensions of the conception of "business affected with a public interest", from the carter to the stage-coach, from that to the railroad, the telegraph, the gas company, the electric light company, etc. Secondly, even if the court cannot formulate an explicit major premise, it should at least inquire whether the *attributes* common to the things analogized connote (are justifications for) the legal consequences in question. Thus the Supreme Court of the United States held that the prices charged by a small local grain elevator in North Dakota could be regulated,[76] in reliance on a precedent which held that large monopolistic elevators in Chicago could be thus regulated.[77] The physical attributes of "grain elevator", rather than the monopolistic economic attribute, was apparently taken as the basis of the analogy; yet the latter attribute seems at least equally material to the determination of the legal consequence, power to regulate.[78] The formulation of a generalization connecting analogies will not eliminate, but it can reduce, the risks of reasoning.

Reductio ad absurdum rests upon the theorem that if any proposition implies its own contradictory, the proposition is false.[79] Reduced to this primitive form, the argument has a simple and seductive certainty which appealed more to an earlier generation of judges and lawyers than it does, apparently, today. It is dangerous because it encourages over-generalization, the failure to make materially useful or needed discriminations. A classic example is Lord Abinger's opinion in the famous case of *Priestley v. Fowler,*[80] the leading precedent

75. EATON, 556-557; MILL, A SYSTEM OF LOGIC (8th Am. ed. 1884) 142.

76. Brass v. North Dakota *ex rel.* Stoeser, 153 U. S. 391, 399 (1894).

77. Munn v. Illinois, 94 U. S. 113, 123 (1876).

78. See Scott, *Judicial Logic as Applied in Delimiting the Concept of Business "Affected with a Public Interest"* (1930) 19 KY. L. J. 16, excerpted in HALL, 575-577.

79. EATON, 371, 374; COHEN AND NAGEL, 89-91.

80. 3 M. & W. 1, 150 Eng. Rep. R. 1030 (Ex. 1837). For example: "If the owner of the carriage is therefore responsible for the sufficiency of his carriage to his servant,

for the fellow-servant rule (now generally obsolete), that an employer is not liable to pay damages for an injury to his employee which resulted from the negligence of a fellow-employee: If a man after prudent inquiry buys a carriage for his servant to drive, should he be held liable to pay damages to the servant for injuries due to defects in the carriage resulting from the negligence of the carriage-maker? Lord Abinger believed an affirmative answer would be absurd (*i. e.,* patently unworthy of belief).. He then assumed that any rule which applies to fellow-servants must also apply to a servant and a carriage-maker, thereby overlooking a discrimination, which present law has recognized, between a servant and an independent contractor. Hence his *reductio ad absurdum* argument consists of assuming a generalization so inclusive as to imply a proposition that was contradicted by another proposition independently established. In this sense the proposed generalization—that a master is liable for the fellow-servant's negligence—implied its own contradictory. The law has grown and adapted its norms to novel situations and emergent values by making new discriminations and thus, in substance, increasing the bulk of rules and the varieties of legal concepts or categories. *Reductio ad absurdum* as an argument against making new extensions or categories appeals to the cautious judge who is unwilling to commit himself to propositions that may imply more than he intends. The same type of argument can be used against proposed legislative innovations. As ordinarily used it gains its persuasive urgency by concealing an assumption which is the crux of the argument, and thus becomes a kind of sophistry.

The argument, *a fortiori,* as discussed in treatises on logic, depends upon a relation of transitivity, which was discussed above.[81] Now one of the transitive relations is class-inclusion, which validates (is exemplified in) many syllogisms, *e. g.,* those in which both premises affirm something about a relation of classes. Thus: "All warranties are contracts. All contracts are promises. Therefore, all warranties are promises." The argument *a fortiori* might be stated thus: "A warranty is a contract, *a fortiori* it is a promise." This last argument is an *enthymeme,* a syllogistic argument in which one of the premises is not stated.[82] It will be noted that the fuller statement of the argu-

he is responsible for the negligence of his coach-maker, or his harness-maker, or his coachman." Priestley v. Fowler, *supra* at 5-6. The learned judge fails to ask himself whether the "coach-maker" referred to is really a servant or an independent contractor for whose negligence the master would not, in the absence of further facts, be liable.

81. Page 878 *supra.* See EATON, 220-222. *Cf.* COHEN AND NAGEL, 116, where the designation *a fortiori* is mentioned only in connection with the relation "being greater than", etc.

82. On enthymemes, see COHEN AND NAGEL, 78. The usage of EATON, 94, 117, seems to be the same: Aristotle used "enthymeme" to designate a rhetorical syllogism, an argument containing a hidden fallacy. *Ibid.*

ment enables one to scrutinize the meanings of the terms, and to ask, "Does it make a difference for the conclusion that you expect to draw, that your proposition is not true unless you exclude insurance warranties (which are not promises) and implied warranties (which are at best fictitious promises)?" Another example would be: "All libels are torts, *a fortiori* they are civil wrongs." Or one might say: "The class of civil wrongs includes all torts, *a fortiori* it includes all libels." Such an argument is valid, but the terminology and classification of law is not such as to make it a very fruitful discourse, and its usefulness is not apparent without a contextual setting to control the meanings of its terms.

An illustration in context is the reasoning (formerly accepted) that since a state has power to exclude a foreign corporation from doing business within its borders, it has power to impose as conditions of entry any requirements which it sees fit.[83] This seems to be an argument *a fortiori*. What does it mean? That the "power" to exclude is a class of powers and that the power to attach conditions is a sub-class within this class? If so, what are the defining characteristics of the class which bring the sub-class within it? The subsequent modification of this doctrine, by a denial that the state can attach as a condition of admission a renunciation by the corporation of its right (power?) to resort to the Federal courts, stated simply that this state power "is subject to the limitations of the supreme fundamental law".[84] The state's power to exclude, then, may be designated as "all powers to impose requirements not contrary to the law of the Federal constitution"—a class "defined" by a negative characteristic. A different interpretation of the argument *a fortiori* is, as was suggested above,[85] based upon a comparison of harms. This interpretation seems to fit the argument that since a state could prohibit entirely the doing of an automobile liability insurance business, it can therefore impose as a condition that the insurance proceeds be available to the injured party;[86] or the argument that since the state could conduct a monopolistic insurance business for its citizens, it can therefore require that the commissions on intra-state risks be paid (in part) to local agents.[87]

83. See the opinion of Hunt, J., in Doyle v. Continental Ins. Co., 94 U. S. 535 (1876), and compare the neat dissection of Hunt's argument by Bradley, J., dissenting. See also Peckham, J., in Security Mutual Life Ins. Co. v. Prewitt, 202 U. S. 246 (1906).

84. Terral v. Burke Construction Co., 257 U. S. 529, 532-533 (1922), overruling cases cited in note 83 *supra*.

85. Page 902 *supra*.

86. Merchants Mutual Automobile Liability Ins. Co. v. Smart, 267 U. S. 126 (1925) (since the state can prohibit the doing of a liability insurance business, it can permit it on condition that the proceeds of the policy be available to the injured person).

87. Osborn v. Ozlin, 310 U. S. 53, 66 (1940) (since state can go into the insurance business, it can prescribe that resident agents share commissions). In each case, there were other justifications for the conclusion reached.

A corporation cannot complain of a lesser harm than a state might lawfully have imposed upon it? This interpretation is, of course, not the exclusive one. In each of the two cases last cited the lesser power (conclusion) was designed to effectuate the same purpose which justified the greater power (premise). The concept of state power thus appears to have (at least) three possible dimensions: Constitutional limitations, degree of harm, and purpose. The argument *a fortiori* is appropriate to each of these three meanings. (Whether they are correct in point of constitutional law is not here determined.) To write judicial opinions in the form of syllogisms would make them tedious, uninspiring and often no more enlightening than at present; yet I conjecture that the law might be better stated if judges would more carefully scrutinize their enthymemes.

Logic and the Theory of Meanings

The foregoing discussion indicates that legal reasoning is more likely to be materially erroneous than formally fallacious. Taking this conclusion as well grounded (though the evidence in support of it is merely exemplified), one might inquire, is it due to an inherent conformity of formal logic to the structure of things or of the human mind, or is it due to the structural identity of the primitive relations of formal logic with the conventional syntax of language, or, more specifically, with the conventional structure of the law? These questions are metaphysical or at least meta-logical, beyond the scope of formal logic. A narrower question of the same sort is, what are the relations of logic (formal or instrumental) to the theory of meanings of terms? The foregoing discussion shows how the use of logical formulations (*e. g.*, in the analysis of *Ribnik v. McBride* [88]) can exhibit the question of meanings, yet it cannot answer it. Similarly, instrumental logic cannot determine this question concretely, though it can direct attention to the context and methodology of the inquiry. Formal logic purports in some sense to be independent of the meanings of terms and yet in developing a theory of relations and classes it develops a theory of meanings. Formal logicians have also developed a logical theory that terms have meanings in two ways: The connotation of a term, or its intension, is the set of attributes of characteristics which determine the class to which it belongs, and the denotation or extension of the term signifies the objects belonging to that class.[89]

88. 277 U. S. 350 (1928), cited note 69 *supra*.

89. Cohen and Nagel, 30-33. Eaton, 241-272, treats the question more fully, and regards the intension of a term as its logical meaning, while the extension of a term is its *psychological* meaning. He also adds a third notion, that of the "comprehension" of a term. *Id.* at 244. Professor Dewey has still another theory of connotation and denotation. Dewey, *op. cit. supra note* 23, 355 *et seq.*

Thus "contract", in a legal context, connotes the requirements which conduct must satisfy in order to be included in the class, and denotes the situations (Jones' agreement with Smith, *X's* agreement with *Y*) which are or will be hereafter thus included.[90] The logical theory points to two sources of information about the meanings of legal terms, the authoritative "definitions" which signify its conventional intension, and the authoritative precedents which determine that described facts do or do not constitute a contract. The theory of meanings in formal logic does not, of course, tell what attributes a contract *should* have, or *shall* have in a specified legal system.

Nor does it tell what terms are *meaningful.* The attack upon meaningless terms has come from outside logic, and has produced several psychological or metaphysical theories of meaning. One is the view that a term has (objective) meaning because of (or in the sense that) it indicates *referents* (objects referred to) to the mind of the person who tries to grasp its meaning; many terms which are in this sense meaningless ("liberty", "goodness", etc.) may nevertheless produce emotive effects.[91] Another view is that (scientific) terms have meanings delimited by the operations to which they refer; or that a term lacks scientific meaningfulness unless it so functions in reasoning as to produce empirically verifiable consequences. To try to state these theories more fully and accurately would be beyond the scope of this essay. They have in philosophy a separate domain coming to be known as "semiotics".

Logic, as an instrument of inquiry, as an account of how continuity and reliability are attainable through reasoning, cannot afford to ignore the meaningfulness of the terms employed. That logic is commonly taken in this sense by lawmen is evidenced by numerous examples. Thus, Professor Williston suggests that in some branches of the law deductive logic plays but little part, while in others it plays a large part, as in cases involving the rule against perpetuities.[92] Now the rule against perpetuities contains certain terms which are operationally precise ("duration of a life in being and twenty-one years thereafter") and hence easy to apply. Yet the rules of deductive (formal) logic are as true of propositions stated in vague terms as of propositions stated in precise terms. Cardozo suggested a similar view when he treated the "method of logic" as one of the four methods of the

90. For further illustrations, see MORRIS, *op. cit. supra* note 66, c. VII. Professor Morris apparently takes extension to be exhausted by the objects which can *now* be pointed to; but the *logical* meaning of extension would seem to include *all* objects within the class.

91. OGDEN AND RICHARDS, THE MEANING OF MEANING (1927), especially 123-126.

92. WILLISTON, *op. cit. supra* note 74, at 154-155.

judicial process.[93] Both of these men were right in believing that logic as an instrument of control over reasoning and communication is dependent upon a theory of meaning.

The lawyer and the judge can, and ordinarily do, reason in a way consistent with the rules of formal logic, without knowing those rules. They can, indeed, reach reasonable decisions (sometimes) without reasoning at all. Yet in the long run and for decisions which justify the expenditure of time and effort, they will get better results if they utilize the resources of logic, both formal and instrumental.

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93. CARDOZO, THE NATURE OF THE JUDICIAL PROCESS (1921) 30-31; THE GROWTH OF THE LAW (1924) 62, 73. See Patterson, *loc. cit. supra* note 59, 160 *et seq.* Eventually he came to recognize that logic is "a tool that cannot be ignored" by any of the methods. THE GROWTH OF THE LAW, at 62.