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Jerome Frank

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MR. JUSTICE HOLMES AND NON-EUCLIDEAN LEGAL THINKING†

JEROME FRANK*

I

MACHIAVELLI AND HOLMES' BAD MAN

Early in the sixteenth century, a brilliant Italian, distressed at the fact that Italy was "without head, without order, beaten, despoiled, torn and overrun" by foreign rulers, longed to see order restored by some wise Italian ruler. He concluded that any such project would fail unless a ruler could be found who would look at things as they were and not merely as he wished them to be. And so Machiavelli wrote *The Prince*, and modern intelligent study of governmental processes began.

It has been said of Machiavelli that "he was the first naturalist who used plain language in a field hitherto preempted by supernaturalists."¹ An apt description, for Machiavelli was the first man, after years of wishful and confused thinking about state-craft, to describe the actualities² of politics so that they could be dealt with intelligently. "I shall depart," he wrote, "from the methods of other people. But; it being my intention to write a thing which shall be useful to him who apprehends it, it appears to me more appropriate to follow up the real truth of a matter than the imagination of it; for many have pictured republics and principalities which in fact have never been known or seen, *because how one lives is so far from how one ought to live, that he who neglects what is done for what ought to be done, sooner effects his ruin than his preservation.*"

†A paper read before the Cornell law club, CURIA, December 22, 1931.

The writer is indebted to Karl N. Llewellyn and Walter Wheeler Cook for helpful criticisms. He is peculiarly indebted to Bernard Sohman of the New York Bar, who carefully read over the paper and vouches that the allusions to mathematics and physics are not incorrect. But none of the foregoing are to be held responsible for the ideas expressed herein.

*Member of the New York bar.

¹LIPPMAN, PUBLIC OPINION (1922) 264. Schopenhauer said of Machiavelli that he "offers not advice but observation."

²There is, of course, no such thing as "pure" observation of phenomena, "pure" description of "facts". A "fact" is a synthesis. An observation or description is selective or interpretative.

As this paper is merely an outline, this point will not be enlarged upon. It should be read into every passage referring to "facts", "things as they are", "actualities", "observation", "phenomena", "description", and the like.

Machiavelli, in his description of the ways of rulers, "proceeds in a calm unmoral way, like a lecturer on frogs." That was and is the proper way for a descriptionist to proceed. But Machiavelli has been maligned as a wicked person by those who could not bear to be told that ideals must be based on actualities, that there is no better way to defeat hopes than to substitute one's longings for one's eyesight.

In the latter part of the nineteenth century in America, Oliver Wendell Holmes, Jr., a keen-minded idealistic lawyer, disgusted with the muddle-headed character of customary ways of dealing with the judicial process, and doubtless with the "wicked" Machiavelli in mind, spoke these words:³

"If you want to know the law and nothing else, you must look at it as a bad man, who cares only for the material consequences which such knowledge enables him to predict, not as a good one, who finds his reasons for conduct, whether inside the law or outside of it, in the vaguer sanctions of conscience. . . . Take the fundamental question, What constitutes the law? You will find some text writers telling you that it is something different from what is decided by the courts of Massachusetts or England, that it is a system of reason, that it is a deduction from principles of ethics or admitted axioms or what not, which may or may not coincide with the decisions. But if we take the view of our friend the bad man we shall find that he does not care two straws for the axioms or deductions, but that he does want to know what the Massachusetts or English courts are likely to do in fact. I am much of his mind. The prophecies of what the courts will do in fact, and nothing more pretentious, are what I mean by the law. . . . The primary rights and duties with which jurisprudence busies itself again are nothing but prophecies. . . . Theory is apt to get the cart before the horse, and to consider the right or the duty as something existing apart from and independent of the consequences of its breach, to which certain sanctions are added afterward. But. . . a legal duty so called is nothing but a prediction that if a man does or omits certain things he will be made to suffer in this or that way by judgment of the court; and so of a legal right. . . . Take again a notion which as popularly understood is the widest conception which the law contains—the notion of legal duty, to which already I have referred. We fill the word with all the content which we draw from morals. But what does it mean to a bad man? Mainly, and in the first place, a prophecy that if he does certain things he will be subjected to disagreeable consequences by way of imprisonment or

³*The Path of Law* (1897) 10 HARV. L. REV. 457, 459, COLLECTED LEGAL PAPERS (1920) 167, 168. Italics in all quotations are the present writer's.

compulsory payment of money... The duty to keep a contract at common law means a prediction that you must pay damages if you do not keep it—and nothing else. If you commit a tort, you are liable to pay a compensatory sum. If you commit a contract, you are liable to pay a compensatory sum unless the promised event comes to pass, and that is all the difference... You see how the vague circumference of the notion of duty shrinks and at the same time grows more precise when we wash it with cynical acid and expel everything except the object of our study, the operations of the law."⁴

Holmes, with his never-to-be-forgotten bad man, began naturalistic legal thinking. Like Machiavelli, he insisted that in trying to understand matters legal it is essential to distinguish between "It is" and "I wish".

There were flaws in Machiavelli's thinking, some of which partly explain why he has been so fiercely denounced. (1) In the first place, his description was faulty for he failed to note sufficiently that ideals—good or bad—affect men's acts, wherefore ideals must be included in a description of men's ways. (2) Also, he seems unwarrantably to have assumed that the good man must in all respects emulate the bad man. (3) And, finally, he neglected the possibility that the ways of men can be changed, that an "ought" can become an "is", that some seemingly fatuous wishes are realizable.

There, as elsewhere, Holmes showed himself the superior thinker. Like Machiavelli, he put aside his own ideals as irrelevant to his purposes as descriptionist; he refused to "neglect what is done for what ought to be done."⁵ But he saw that other men's hopes and

⁴These views had been adumbrated in earlier writings. In *THE COMMON LAW* (1881) he suggested (p. 311) that "we look at the law as it would be regarded by one who had no scruples against anything which he could do without incurring legal consequences." And in the same work (p. 214) he said, "Just as far as the aid of the public force is given a man, he has a legal right whether his claim is founded in righteousness or in iniquity." In 1870 (5 *AM. L. REV.* 1, reprinted in (1931) 44 *HARV. L. REV.* 725-736) he said: "A duty, strictly so called, is only created by commands which may be broken at the expense of incurring a penalty." In 1872 (6 *AM. L. REV.* 593, reprinted in (1931) 44 *HARV. L. REV.* 788, 789) he expressed a doubt "whether law, in the more limited meaning which lawyers give to the word, possessed any other common attribute than of being enforced by the procedure of the court..."

⁵No one can possibly doubt that Holmes is one of the finest idealists of our time. But just because he wanted legal processes to work at their best, he insisted that men should not delude themselves as to how those processes actually do work. But he has been maligned, as was Machiavelli, by those who do not want to be told that their ideals are not in present accord with the actual. See, for instance, the absurd attack on Holmes in Zane's article, *German Legal Philosophy* (1918) 16 *MICH. L. REV.* 287, at 338; cf. Adler's article, *Law and the Modern Mind: A Symposium* (1931) 31 *COL. L. REV.* 82 at 91 and 107.

desires were part of the phenomena he was describing. And he did not advise the good man to adopt the conduct of the bad man, he merely advised him to learn from the observant bad man what is actually going on.

But Holmes did more than that. He did not content himself with substituting an accurate description of legal rights and duties for a false description. He pointed to the fundamental vice in most prior legal thinking. He made it clear that traditional jurisprudence is founded upon the erroneous notion—sometimes expressed but more often implicit—that there are self-evident truths about the judicial process which must not and cannot be questioned, from which self-evident truths a legal system can be worked out logically as the ancient geometers had worked out their system from self-evident geometrical axioms. Holmes saw that law is not pure mathematics; that the so-called self-evident truths of the traditional jurisprudence are not self-evident; and that many of the axioms of legal thinking do not appear on the surface but are concealed and must be dug out for inspection.⁶

Because he was the first thinker completely to undermine the conception that law resembles pure geometry,⁷ because he wrote that a

⁶Cf. THE COMMON LAW (1881) 35-36: "The very considerations which judges most rarely mention, and always with an apology, are the secret root from which the law draws all the juices of life. I mean, of course, considerations of what is expedient for the community concerned. Every important principle which is developed by litigation is in fact and at bottom the result of more or less definitely understood views of public policy; most generally, to be sure, under our practice and traditions, the unconscious result of instinctive preferences and inarticulate convictions, but none the less traceable to views of public policy in the last analysis. And as the law is administered by able and experienced men, who know too much to sacrifice good sense to a syllogism, it will be found that, when ancient rules maintain themselves in the way that has been and will be shown in this book, new reasons more fitted to the time have been found for them, and that they gradually receive a new content, and at last a new form, from the grounds to which they have been transplanted.

"But hitherto this process has been largely unconscious. It is important, on that account, to bring to mind what the actual course of events has been."

⁷For collections of expressions of this idea, see Fink, *The Influence of the Study and Practice of Law* (1872) 1 LAW MAG. & REV. 933, especially at 950-952; and DICKINSON, ADMINISTRATIVE JUSTICE AND THE SUPREMACY OF THE LAW (1927) 115 n. Cf. ABBOTT, JUSTICE AND THE MODERN LAW (1913) 11-12:

"The judicial process in ascertaining and applying the unwritten law is essentially similar to the learning process by which we acquire our geometry. The Pythagorean theorem is that the square erected upon the hypotenuse of a right-angled triangle is equal to the sum of the squares erected upon the other two sides, and it is so named because it is supposed to have been discovered by Pythagoras. This mathematical law, however, was understood, so it is said, by the

legal system "cannot be dealt with as if it contained only the axioms and corollaries of a book of mathematics,"⁸ and that it was dangerous to believe "that a given (legal) system, ours, for instance can be worked out from some general axioms of conduct,"⁹ *Holmes can fairly be said to have invented non-Euclidean legal thinking.*¹⁰

II

THE NATURE OF NON-EUCLIDEAN LEGAL THINKING

The reader may object to such a description. Euclid, he may say, was a geometer. "Non-Euclidean" is an adjective referring to geometry in its most difficult form. Why talk of non-Euclidean legal thinking?

The answer has already been indicated. But a more complete answer runs thus: The notion behind non-Euclidean geometry is not inherently mathematical but significantly affects thinking in any field. That this notion is the basis for new ways of thinking about thinking will become apparent from a brief survey of its history.¹¹

As just noted, for hundreds of years men had accepted certain axioms of Euclid as "self-evident truths",— self-evident, it was said, because their opposites were inconceivable.¹² From these self-evident

Egyptians as a matter of practical experience long before the theoretical proof of it was discovered by the Greek mathematician, and the truth of it has of course been confirmed by uniform human experience in all the ages. In other words, reason and experience, theory and practice, are here in agreement. Nevertheless, when we teach geometry we do not appeal to experience, nor are we content with practice; we appeal to reason and we demand the theory. We do not ask the boy to believe it to be true because Pythagoras discovered it, which is the principle of authority, or because it has always been found to be true, which is the principle of experience. On the contrary, we set the triangle before him, we make him study its inherent properties, we require him to ascertain for himself that they necessarily involve the truth of the theorem. So, too, when he apprehended the demonstration, he believes it and accepts it as true for the rest of his life, and it never occurs to him to test its truth by practical use."

⁸THE COMMON LAW (1881) I.

⁹*Op. cit. supra* note 3 at 465, COLLECTED LEGAL PAPERS at 166, 180.

¹⁰Keyser would call it "postulational" thinking. See KEYSER, THINKING ABOUT THINKING (1916) which the writer found an invaluable aid to his non-mathematically trained mind in understanding the nature of non-Euclidean thinking. Cf. M. R. COHEN, REASON AND NATURE (1931), 413 and Clark's article *The Socializing of Theoretical Economics* in TUGWELL, TREND OF ECONOMICS (1924) 73, which the writer first read after this paper was substantially completed.

¹¹Cf. KEYSER, *op. cit. supra* note 10; LEWIS, ANATOMY OF SCIENCE (1926) 29 et. seq.; ENCYCLOPEDIA BRITANICA (14th ed. 1929) Vol. 10, pp. 174, 180; Vol. 8, p. 802; Vol. 19, p. 90.

¹²Some writers think Euclid was quite well aware that his axioms were not self-evident. Cf. KEYSER, *op. cit. supra* note 10, 25-28.

truths Euclid logically deduced other propositions, thus building his geometry. But some mathematicians began to question one of Euclid's self-evident truths, his parallel axiom, which in simplified form may be stated thus: Through any point outside a line, one and only one parallel can be formed. That axiom did not seem to some thinkers to be a self-evident truth. Its opposite, they suspected, was conceivable. So began efforts to prove it by deducing it from Euclid's other self-evident truths. In the eighteenth century there arose the suggestion that a geometry could be developed in which the parallel axiom is abandoned.¹³ This suggestion bore fruit in the nineteenth century. In the geometry of Lobachevski more than one parallel can be drawn, while in that of Riemann no parallel can be drawn.¹⁴

But if one of Euclid's self-evident truths could be dropped, it occurred to mathematicians that so could others. And geometries have been made in which another of Euclid's axioms was denied.

There emerged the clear-cut recognition that such geometries involved a denial of the self-evidence of so-called self-evident truths. The axioms of Euclid were now recognized as mere assumptions. As one writer puts it, the dethroning of the self-evident was analogous to a change from an absolute monarchy to an ideal democracy in which the "self-evident truth", which ruled by the Divine right of alleged inconceivability of the opposite, has been replaced by the "assumption", which is elected for its qualification to serve.¹⁵

It follows that the seeming self-evidentiary character of any axiom is no longer reputable as a sufficient argument in its favor. A rival axiom, postulate or assumption may always be put forward as a candidate and has an excellent chance of being elected if it can be shown to be better than the old. "Better" means that from the new axiom or assumption there can be deduced a body of propositions which is more serviceable than the body of propositions deducible from the old system.

So much was made manifest to mathematicians by the invention of non-Euclidean geometries. But as long as such geometries were the mere playthings of pure mathematics their most important implications were not observed by most thinkers.^{15a} Those implications be-

¹³Saccheri, in 1733, published a work which is considered the beginning of non-Euclidean geometry.

¹⁴With reference to the parallel postulate, there are three principal geometries—the "parabolic" or Euclidean, the "hyperbolic" or Lobachevskian based on a denial of the postulate, and the "elliptic" or Riemannian according to which parallel lines do not exist at all.

¹⁵ENCYCLOPEDIA BRITANNICA (14th ed. 1929) Vol. 10, p. 174.

^{15a}To anyone who keeps the dates in mind, it is obvious that Dickinson is in error in intimating that the new kind of legal thinking begun by Holmes was

came manifest when Einstein showed that Euclidean geometry, was for some purposes, less useful than non-Euclidean geometry in describing and explaining certain astronomical data, many men then came to realize, as never before, the difference between pure mathematics and other kinds of thinking. The difference may be briefly described thus:

The axioms or fundamental assumptions of pure mathematics can be chosen arbitrarily. The axioms or fundamental assumptions in any other kind of thinking cannot.¹⁶

This distinction is frequently overlooked. It is essential to clear thinking. For pure mathematics need have no relation to anything in the existing world.¹⁷ Its axioms or assumptions may be nonsensical from the point of view of what has happened or is happening or will ever happen. In pure mathematics one asks, "If *X* is true and *Y* is true, what then logically follows?" The "ifs" may be whatever you

suggested by the work of Einstein. See Dickinson, *infra* note 29 at 834, and Frank, *infra* note 29 at 30.

¹⁶Cf. Whitehead in *ENCYCLOPEDIA BRITANNICA* (14th ed. 1929) Vol. 15, p. 88: "In pure mathematics the hypotheses which a set of entities are to satisfy are given, and a group of interesting deductions are sought. In 'applied mathematics' the 'deductions' are given in the shape of the experimental evidence of natural science, and the hypotheses from which the 'deductions' can be deduced are sought. Accordingly, every treatise on applied mathematics, properly so called, is directed to the criticism of the 'laws' from which the reasoning starts, or to a suggestion of results which experiment may hope to find. Thus, if it calculates the result of some experiment, it is not the experimentalist's well attested results which are on trial, but the basis of the calculation."

Cf. BERTRAND RUSSELL, *THE SCIENTIFIC OUTLOOK* (1931) III-III2.

Lewis, *op. cit. supra* note 11 at 43, writes of non-Euclidean geometries: "Are those geometries true and is Euclid's geometry false? This is a question which no longer conveys any meaning to our minds. Is chess true? Provided that a geometry contains within itself no inconsistencies or absurdities, then we regard it as true just in so far as it is interesting or useful." Note that he says "interesting or useful". From the point of view of pure mathematics, utility in the actual world is not a criterion. See *ENCYCLOPEDIA BRITANNICA* (14th ed. 1929) Vol. 15, pp. 82, 87-88. It often happens that mathematical mechanisms, useless when contrived, turn out to have immense value in the natural sciences (cf. WHITEHEAD, *INTRODUCTION TO MATHEMATICS* (1911) 101, 136); but their subsequently proved utility is not of the essence to the mathematician. (Cf. LEWIS, *loc. cit. supra* note 11 at 43-44, with respect to the geometry of so-called negative curvature.) It is said that a pupil of Euclid, after learning the first proposition in geometry, wanted to know what he would gain by learning such things. Euclid called his slave and said, "Give him three pence since he must needs make gain by what he learns." See Edna Millay's poem *Euclid Alone Has Looked on Beauty Bare*.

¹⁷A qualification of that statement, unnecessary in this sketch, will be found in HOOK, *METAPHYSICS OF PRAGMATISM* (1927) c. III.

please. Consequently, the "what thens" may be whatever they happen to be. If among the "what thens", Q , R and S turn up, pure mathematics does not care whether Q or R or S exists or can exist. A pure mathematician may say, "Let us assume that the quantity of wheat produced in Kansas is directly related to the size of the population of Mars", and then reason out, logically, the consequences of these and other assumptions. Bertrand Russell was speaking of pure mathematics when he said, "Mathematics may be defined as the science in which we never know what we are talking about nor whether what we are talking about is true." (It is easy to see why Lewis Carroll, a mathematician, wrote one of the world's masterpieces of nonsense fiction.)

In pure mathematics, then, (1) self-consistency and (2) simplicity of the axioms are the primary demands made upon the thought system.

But matters are significantly different when one turns to thinking about applied mathematics, or physics—or, indeed, thinking in any field in which actual phenomena (such, for instance, as social phenomena) are being studied. Then these important additional questions must be asked about any proposed axioms: (a) Do those propositions consist of descriptions based upon observation of the phenomena in that field? (b) If not, then are these propositions useful assumptions which are logically related to descriptions based upon observations of the phenomena in that field? Do deductions from these assumptions correspond with sufficient adequacy to those descriptions based upon observations of the phenomena?¹⁸

The invention of non-Euclidean geometry and its proved usefulness in physics has then fostered notions of extreme importance in every department of thinking. In the light of those notions the use of challenging scientific theories takes on a new aspect. It is now plain that a revolution in scientific thinking is usually the result of these causes: (a) The discovery that there are observed facts which are discrepant with the logical deductions from the theretofore governing assumptions; and/or (b) dissatisfaction with complicated qualifications and modifications of the governing assumptions made necessary to adjust those assumptions to those discrepant facts.¹⁹

¹⁸Pure mathematics can roam at large in the realm of the possible. Other thinking has no such latitude. This distinction is prettily illustrated in this sentence from Hogben (*THE NATURE OF LIVING MATTER* (1931) 95): "We do not dismiss the hypothesis that thunderstorms occur when a blue unicorn sneezes on Uranus, because it is usually possible to disprove so engaging a fancy, but because other ways of treating thunderstorms lead to more useful conclusions."

¹⁹See Appendix hereto on *A non-Euclidean Account of Changes in Astronomical Theory*.

For these causes foment opposition to old axioms. Men think of possible alternatives. And when a new assumption is put forward which promises to govern more simply, the new is swept into office by a large vote. It is elected not because it is self-evident and the ousted postulate was not, but because the new is easier to get along with and because, too, the new hints that perhaps it will suggest new facts which may be discovered and controlled.²⁰ But there is no assurance that the newly elected postulate will hold office forever.²¹ Recall of postulates or axioms is now a well-established principle.

Axioms have been secularized. They are now regarded merely as assumptions, and no assumptions are considered sacrosanct. In any system of thinking, concealed assumptions can be brought to light and interrogated as to their usefulness.²² The detection of concealed assumptions and the willingness to consider alternative assumptions;²³ the choice between assumptions on the basis of (a) their *simplicity*; (b) their *correspondence* (directly or indirectly through logical deductions from them) *with the observed phenomena*; and (c) their value as possible aids to *the discovery of further phenomena not yet observed*²⁴—that is what non-Euclidean thinking means.²⁵ It is not a totally new

In Point IV below there will be considered the use of postulates as bases for possible changes in the actual world.

²⁰It is said that it would still be possible to explain observed astronomical facts by the Ptolemaic theory, through the introduction of more epicycles. But the rival assumptions not only do the job more simply but also more adequately suggest the possibility of new discoverable facts. See Appendix I to this paper.

²¹Nor are the old assumptions always banished. Thus, even after Einstein, the Newtonian system is still allowed to hold office, but it now presides over a more limited province of phenomena. So Euclid's geometry in its aspect as a "natural" geometry is still alive and functioning but on a smaller scale.

A scientific revolution is not, then, necessarily a bloody revolution in which the old axioms are decapitated. Cf. COHEN, *op. cit. supra* note 10, 86.

It is helpful to note here the suggestion of Bernard Shaw and Walter Lippman that an election in a democracy is a substitute for revolution, a sort of denatured civil war. See LIPPMAN, *THE PHANTOM PUBLIC* (1925) 59.

²²Just as a concealed political boss may be smoked out and questioned as to the wisdom of his rule.

²³Cf. KEYSER, *op. cit. supra* note 10, c. IV; COHEN, *op. cit. supra* note 10, 110; ADLER, *DIALECTIC* (1927) 30, 126.

²⁴Cf. KEYSER, *op. cit. supra* note 10, 63-65; COHEN, *op. cit. supra* note 10, 110, 143; LEWIS, *op. cit. supra* note 24, 13.

²⁵Assumptions which have at any time proved to be logically related to observed "objective" phenomena are themselves to some extent "objectively" true, for they are in part expressive of the relations of the "objective" phenomena. New assumptions are selected in place of old assumptions because they are more clearly or more completely descriptive of those relations. "We may doubtless view our known laws of nature as hypotheses or guesses as to how nature will

way of thinking. Its newness consists in the fact that it consciously and deliberately employs ways of thinking which heretofore were used but without full awareness²⁶ of their nature.²⁷

Now apply these notions to legal thinking. The traditional jurisprudence rests upon propositions some of which are explicit and avowed and some of which are not. We may imagine the Euclidean jurist defending these propositions on one or all of these grounds:

(1) These propositions, or some of them, he says (or might say) are self-evident truths; their opposites are inconceivable; they are so obviously true that it would be silly to try to prove them.

Such an answer we are now in a position to treat as insufficient.

(2) Those propositions, or some of them, are, he says (or could or would or should say), true in the sense that they are moderately correct descriptions of what goes on in the legal world.

(3) Those propositions, or some of them, he says (or could or would or should say), are assumptions which are highly useful to a correct understanding of what goes on in the legal world. They are indirectly in accord with the observed phenomena of the legal world because logical deductions from those assumptions jibe with moderately correct descriptions of the observed phenomena.

The second or third answers raise these questions: Are there any of the express or concealed axioms or postulates of the traditional jurisprudence which are inadequate because they do not (directly or indirectly) jibe with what happens or could be made to happen in the legal world? If so, how can they be modified so as to make them adequate? Will the necessary adjustments make these old assump-

behave," writes Morris Cohen. "But if these guesses prove a clew to physical reality, it must be because they contain something which is objectively true and not merely our own creation," review of RUEFF, *FROM THE PHYSICAL TO THE SOCIAL SCIENCES* (1931) in (1931) 44 HARV. L. REV. 1149, 1151. See also COHEN, *loc. cit. supra* note 10, 141-143, 225, 228, 230, 239.

²⁶Compare F. C. S. SCHILLER, *FORMAL LOGIC* (1912) 295: "The less consciously a postulate is made, the more easily it is taken as self-evident. . . Postulates anticipate further confirmation. But they are quite frank about it and do not pretend to be more than the assumptions that they are."

²⁷*Cf.* KEYSER, *loc. cit. supra* note 10; Cohen in (1931) 44 HARV. L. REV. 1149, 1154; McKEON, *SELECTIONS FROM MEDIEVAL PHILOSOPHIES* (1930) II, x. ADLER, *loc. cit. supra* note 23, 14, 122, 126, 234, 258, and TAYLOR, *PLATO* (1909) 201, 291-293, assert that Plato was a thoroughly self-conscious "postulational" thinker in all his writings. There is, of course, an opposing view. See, for instance, LIVINGSTONE, *THE GREEK GENIUS AND ITS MEANING FOR US* (1912) 181-202; GRAHAM WALLAS, *THE ART OF THOUGHT* (1926) 55; Singer in *THE LEGACY OF GREECE* (1921) 175 (*cf.* Burnet, in the same volume, 80-95). See also G. C. FIELD, *PLATO AND HIS CONTEMPORARIES* (1930) and LANGE, *HISTORY OF MATERIALISM* (1873) I, c. iii.

tions cumbersome? Are there alternative assumptions which more simply and adequately click, directly or indirectly, with the observable facts? Will these alternatives help us uncover facts which have been overlooked?

The most important fact about matters legal is that they exist or can exist. Consequently, *legal axioms or postulates must relate to the (present or potentially) existent. The legal thinker should never let himself believe that he is dealing with pure mathematics. Logical deductions from legal postulates must square with observable phenomena—else the postulates are wrong.*^{27a}

Now Holmes made the first direct attack, in non-Euclidean fashion, on some of the basic propositions of the traditional jurisprudence. He rejected the argument of self-evidence and he showed that some of these postulates were neither (a) verified nor verifiable descriptions of legal phenomena, nor (b) assumptions from which satisfactory logical deductions could be made which squared with verified or verifiable descriptions of the observed facts of the judicial process.

Holmes with his bad man pointed out the error in the old axiom that legal rights and duties could be logically deduced from the so-called legal rules. As Copernicus caused men to drop a geo-centric notion of the universe and to take up a helio-centruction notion, so Holmes' bad man will, sooner or later, compel all intelligent persons to acknowledge that the center of the legal world is not in the rules but in specific court decisions (*i. e.*, judgments, orders and decrees) in specific lawsuits.²⁸ Because of Holmes' clear vision we are able to see that what any specific man may and must lawfully do and not do is discoverable not in books but in some actual lawsuit which has occurred or may occur in a court-house,—a lawsuit relating to some acts or words of that specific man.

But having begun non-Euclidean thinking, Holmes did not, of course, exhaust its possibilities. Other assumptions of traditional jurisprudence could be questioned. And recently they have been. Suggestions are being made today that we negate or abandon (on one or more of the grounds above noted) one or more of the express or concealed assumptions of the traditional jurisprudence.

Now a cardinal mistake of those who criticize these suggestions is that

^{27a}This does not mean a commitment to a narrow-minded acceptance of what now exists. It does mean that attention should be directed to the achievability and unachievability of changes however desirable. See point IV below.

²⁸Holmes' bad man may be compared with that most precocious of children who, as the Emperor passed by, admired for his clothes by the assembled crowd, cried out, "But he has nothing on at all!"

they assume that all non-Euclidean legal thinkers are in agreement.²⁹ That is absurd. They need not be and they are not. As in geometry so in the legal field, one non-Euclidean drops one old proposition; another, another old proposition. Or two non-Euclidean agree that a given old proposition should be dropped but disagree as to the substitute or as to whether there should be or can be a substitute. There is much disagreement, for instance, among such non-Euclidean as Cook, Llewellyn, Green, Yntema, Hutcheson, Arnold, Frank, Radin, Bingham, Clark, Powell, Frankfurter, Hamilton, and Oliphant.³⁰

III

NEGATING SOME AXIOMS OF THE TRADITIONAL JURISPRUDENCE

As an experiment, let us examine briefly one set of axioms of the traditional jurisprudence which reads thus:

In our judicial system the personality of the judge—his peculiar set of individual reactions—has a relatively small effect upon legal rights; our system has reduced those effects to a minimum. The prejudices, passions and weaknesses of the judge are enormously diminished in their effects by the fact that a judge is required to and does center his attention on a body of impersonal legal rules. These rules prevent cases from being decided by “the private mind of the judge unguarded against his predilections”. Decisions are the product of those rules applied by the judge to the facts of cases.

This is a paraphrased summary of a passage from Dickinson.³¹

²⁹Pound, *A Call for A Realist Jurisprudence* (1931) 44 HARV. L. REV. 697; Dickinson, *Legal Rules: Their Function in the Process of Decision* (1931) 79 U. OF PA. L. REV. 833. For a criticism of Pound see Llewellyn, *Some Realism About Realism* (1931) 44 HARV. L. REV. 1222. And cf. Yntema, *Rational Basis of Legal Science* (1931) 31 COL. L. REV. 925. For a related criticism of Dickinson, see Frank, *Are Judges Human?* (1931) 80 U. OF PA. L. REV. 17, 233, at 263.

³⁰Thus the present writer disagrees with some of the non-Euclidean as to the possibility of developing a “science of law”, (see *loc. cit. supra* note 29 at 256) or about the feasibility of reinterpreting decisions in contested cases from an examination of the printed records. See Frank, *What Courts Do In Fact* (1932) 26 ILL. L. REV. 645, 761 at 769-770.

³¹*Op. cit. supra* note 7 at 141. The passage reads:

“Judges are human instruments with prejudices, passions, and weaknesses. As it is, they often decide a new point or a doubtful point, ignore a principle, narrow a rule, or expand a concept under the influence of these human limitations. But *this influence is enormously diminished by the necessity of centering their attention on a mass of considerations which lie outside the color of the case at bar; and by the habit of coming at every question from the angle of a dry and abstract logic.* As a system of logic, the law may be artificial, inadequate, and harsh; but precisely because it is still a system of abstract logic, it spreads a net of allaying oil over the

A related package of axioms reads thus: A judge is required to set forth publicly the reasons for his decision *in terms of legal rules*; this requirement secures the public "against the well-meant ignorance of the weak judge" and is a "mainstay against improper motives" on the part of the crooked judge.

This is a paraphrase of a passage from Dean Pound.³²

Now let us note that Dickinson and Pound advance no proof of the factual truth of these propositions. They do not show that they are based upon observation of what actually happens in court-rooms. They do not show, on the other hand, that, if you begin with these postulates, you can work out deductions which will jibe with observation of what actually happens (or can be made to happen) in court.

Suppose, now, we abandon those postulates and tentatively substitute the following assumptions:

The human element in the administration of justice by judges is irrepressible. A judicial decision is a decision by a human being called a judge.³³ The more you try to conceal the fact that judges are swayed by human prejudices, passions and weaknesses, the more likely you are to augment those prejudices, passions and weaknesses. Our legal system has been built up about the beliefs that (1) a judge centers his attention on impersonal so-called legal rules; (2) that

controversies of the moment and makes necessary an appeal from the claims of particular litigants to the interests of men in general as worked out over a long period into a body of impersonal and artificial rules which command respect. The very generality of the law, which in a given case may produce hardship by requiring the omission of seemingly pertinent considerations, affords a safeguard in most cases because *it does not permit the judge to take into account matters which might draw his attention from the merits of the cause to his personal interest in the suitors.* A perfectly flexible system of justice without law might afford an instrument for reaching an exactly just result in each case by a free balance of considerations; but under such a system the balance would have to be struck by the private mind of a judge unguarded against his predilections. It is safer to have in the rough logic of the law a balance not so fine but at least more impersonal; a layer of insulation interposed between the man within the judge and his human preferences."

³²*Justice According to Law* (1913) 13 COL. L. REV. 696 at 710. The passage reads: "If rules and over-rigid standards sometimes hinder the judge and prevent the best solution of which he is capable, they *secure us against the well-meant ignorance of the weak judge* and are a *mainstay against improper motives* on the part of those who administer justice. Oriental judges, bound by little or no law, are notoriously corrupt. A judge tied down on every side by rules of law and the necessity of publicly setting forth his reasons on the basis of such rules cannot do much for a corrupter if he would."

³³This discussion neglects jury trials. With respect to jury trials the traditional postulates are almost self-evidently erroneous. See FRANK, *LAW AND THE MODERN MIND* (1930) 170-185, 302-309.

his decision is the product of his application of those rules to the facts of the case; and (3) as a consequence, the human element in decision-making is reduced to a minimum. These beliefs, and the attending requirement that judges should write opinions explaining their decisions in accord with this belief, enhance the evil effects of the judges' prejudices, passions and weaknesses. For, as a result, self-scrutiny by judges of their own thought-ways is often blocked and it has become compulsory and respectable for judges to give explanations of their decisions in so artificial a manner as to insure, to the maximum, the concealment from the judges and others of judicial biases and predilections, and from others of judicial laziness, ignorance, or crookedness (when such unfortunate factors exist).

A variety of influences affect judicial decisions (*i. e.*, court judgments, orders and decrees). Among those influences are the so-called legal rules. Sometimes those rules have considerable influence, sometimes little. How much effect those rules will have is unknown; it may always be unknowable; it varies with the judge and with the particular case, especially if the case is "contested" (*i. e.*, involves conflicting testimony on a critical fact-issue). Knowledge of all the legal rules now in existence will not enable anyone to define most legal rights and duties³⁴ with any high degree of accuracy. For those legal rights and duties mean merely what a judge will decide in specific cases. And most future specific decisions are not predictable with any high degree of accuracy because no one can prophesy whether any particular future lawsuit will be "contested" (*i. e.* whether questions of fact will be raised and conflicting testimony introduced), and, if so, what witnesses will be believed, what the judge will guess as to the facts of the case, and what his reactions to that guess will be. For judges behave substantially like the human beings who are not judges.

The core of this package of substitute postulates is that the human element in the judicial determination of legal rights and obligations is irrepressible, and that a system like ours which seeks to repress and conceal that human element makes for the operation of the judges' failings in their most evil form.

Note that the writer does not dogmatically say that the suggested alternative postulates *are* or *must be* true. He says: "Try them out. See if they are not more accurate, more adequately adjusted to what exists, to what occurs every day in court houses. If they are, or as far as they are,³⁵ they are true. Perhaps they are false, or partly false.

³⁴These words are intended to include the entire Hohfeldian assortment.

³⁵*Cf.* Schiller, *op. cit. supra* note 26 at 126, to the effect that a deduction from a

Perhaps there needs to be inserted in those postulates such words as 'sometimes' or 'more often than not', or the like. They are suggested assumptions, tentatively formulated. If they are more serviceable than the old assumptions, good; if not, then away with them."

Now go back to the Pound-Dickinson axioms. Examine them carefully and you will find that they are sophisticated restatements of very ancient axioms. In more naive form they are discoverable in Blackstone's axiom that the judge is a mere passive oracle or mouth-piece of a somewhat called Law, a sort of a speaking-tube through which Law talks to the laity. And Blackstone's axiom is in turn traceable to the axiom that society must, can, and does have a government of laws and not of men.

And if we keep on pushing back we come to the early period in social development when private armed conflicts are in process of yielding to some sort of judicial procedure. We then come close to the genesis of these axioms: They are born of fear of human judgment, of a demand for a magical or Divine source of decisions. The early modes of trial (the ordeal, the judicial duel, the oath, the compurgators) are substitutes for private war. But these substituted arbitrations are considered to involve no human element. The judgment is the judgment of the supernatural, or "the judgment of God". The appeal is to magic or to Heaven. The decision is the infallible decision of the superhuman power. *Decision-making is deemed impersonal, non-human. Slowly, oh so slowly, there emerges a tolerance of a human being as the proper decider of the issues. Legal history might be written in terms of the increase of that tolerance. But, while in practice the human decider becomes more and more apparent, in theory the old fear, the old intolerance remains.*³⁶ The old axioms become more and more out of line with actual events; as a consequence, there develops much tinkering with the old axioms in the hope that it can be adjusted sufficiently to square with the facts. *And so, at last, we reach Pound and Dickinson, whose axioms do not mesh with observable occurrences in the legal world. The only value of the Pound-Dickinson axioms is the doubtful one that they mesh with ancient fears and antiquated hopes.*

The recent history of physics furnishes some amusing suggestion. The famous Michelson-Morley experiment in 1887 showed that the

postulate is never expected to conform completely to the observed facts; the question is, does it "conform sufficiently not to impair its usefulness." See RUSSELL, *op. cit. supra* note 16 at 63: "When a man tells you that he knows the exact truth about anything, you are safe in inferring that he is an inexact man."

³⁶This theme was the subject of some recent lectures by the writer which will be incorporated in a book now in process.

velocity of the earth through the ether could not be measured. There developed the theory that this non-measurability was due to the fact that motion through the ether altered the dimension of bodies so that all measuring instruments contracted or shrank in exactly the same ratio as the length to be measured.

"It appeared then", writes Jeans,³⁷ "that if the earth moved through the ether this motion was concealed by a universal shrinkage of matter, and this shrinkage was in turn concealed by some other agency or agencies.

"At this time the word 'conspiracy' found its way into the technical language of science. There was supposed to be a conspiracy on the part of the various agencies of nature to prevent man from measuring his velocity of motion in space. If this motion produced a direct effect x on any phenomenon, the other agencies of nature seemed to be in league to produce a counter-vailing effect— x . A long train of experiments had not revealed, as was intended, our velocity through the ether; they had merely created a conviction that it was beyond the power of man to measure this velocity. The conspiracy, if such there was, appeared to have been perfectly organized.

"A perfectly organized conspiracy of this kind differs only in name from a law of nature. The inventor who tries to devise a perpetual-motion machine may come to the conclusion that the forces of nature have joined in a conspiracy to prevent his machine from working, but wider knowledge shows that he is in conflict not with a conspiracy, but with a law of nature—the conservation of energy. In 1905 Einstein, crystallizing an idea which must have been vaguely present in many minds, propounded the hypothesis that the apparent conspiracy might be in effect a law of nature. He suggested that there might be a true law to the effect that 'it is of necessity impossible to determine absolute motion by any experiment whatever.'

Now the traditional legal postulates we have been discussing are confronted with a "conspiracy" much like that which confronted the physicists. The human characteristics of judges seem to be engaged in an unrelenting "conspiracy" to upset the deductions from those traditional postulates. Pound and Dickinson and their followers keep adjusting the postulates in an effort to suppress (or explain as unreal) the "conspiracy". They have failed. The moral is, it would seem, that the irresistible "conspiracy" must be accepted as an inherent part of the judicial process.³⁸ The personality of the judge (or jury) is one of the most important factors in the decision of any "contested" case. Any man's legal rights and duties may turn on the

³⁷ENCYCLOPEDIA BRITANICA (14th ed. 1929) Vol. 19, p. 91.

³⁸The reader is urged at this point to read Appendix II to this paper, *Some Apposite Science Bed-Time Stories*.

more or less inscrutable makeup of the judge (or jury) who may happen to try the case in which those rights and duties are determined.

IV

THE DISTINCTION BETWEEN "IS POSTULATES" AND "WISH POSTULATES"

It will probably be apparent that one of the major difficulties with the traditional postulates just criticized is this: Those postulates are a confused mixture of

- (a) "There should be;" and
- (b) "There is."

Pound and Dickinson are confusing the desirable and the existent. They slide back and forth (without being aware of it) from stating "what I would like to see happen in the future" to "what is now happening,"—from a program for the future—which may or may not be realizable—to a description of existing facts.

Now there is no good reason whatsoever why any thinker should not start with programmatic postulates and logically deduce their consequences. He can say (1): "Suppose it were possible to have a legal world the way I would like it. Of course, it does not now exist. But this is the way it would be. Such a world would implicate certain postulates which I shall set forth. Here they are. To bring such a legal world into existence, it is necessary to create conditions in which those postulates will have reality. This is how it could be done." Or he can say (2): "Here are some legal postulates which I suggest. If they existed, then, by logical deduction, it is apparent that the legal world would be thus and so. That would be a desirable legal world. It is now non-existent. I suggest that we try to procure its existence. The means of doing so are as follows."

If you avowedly formulate "wish-postulates", you can then be rigorously logical in working out your implications. You can painstakingly seek to learn what changes in the existing order are necessary conditions of the fulfillment of your wishes. *But if you mix up wishes and ises, you are likely to be sloppy, inconsistent, timid and wavering. Why? Because you will have a half-conscious fear of the consequences of your assumptions, a fear that what is implied in your postulates will be shown up as a false description of what is now going on. One cause of your mixing up "I wish it were so" and "It is so" is precisely that you dislike facing the fact that what you want does not exist—and may be impossible to achieve.* The fear of that disclosure will make you dogmatic. You will insist that your axioms are self-evident, that *they must be factually true.*

But if you do separate "wish postulates" and "is postulates", you will at once improve the quality of your thinking. You will abandon self-evidence as a characteristic of your assumptions. You will be courageous in working out the implications of your assumptions. Your "is postulates" will be recognized as suggested means for adequately working out generalizations relating to the observable court house phenomena either (a) as possible guides in predicting concrete legal events—*i.e.*, specific judicial decisions (judgments, orders and decrees)—or (and this happens to be the writer's present inclination) (b) as showing or tending to show the impossibility (sometimes or always) of so predicting. If your "is postulates" do not square with the phenomena, you will be ready to modify or abandon them. Since you know they are mere assumptions, you will follow out their consequences without timidity in order to discover their inadequacies as well as their adequacies.

And so with your "wish postulates". Recognizing them for what they are, you will not be hesitant in working them out with clarity to their logical conclusions. You will not then, to paraphrase Hogben,³⁹ "invent hypotheses to explain facts that do not exist" and "then proceed to give false interpretations to facts that do exist." Consistency and clarity you will then welcome and not dodge. And you will see the indispensability to your programmatic assumptions of approximately accurate descriptions of the existent. In this way you will acquire the habit of "sterilizing the instruments of research before undertaking surgical operations upon the body politic."⁴⁰

It is understandable why Pound and Dickinson resist the separation of "It is" and "I wish". The longing for legal stability is so strong that, as John Stuart Mill saw, "*ought and should grow into must.*"⁴¹

³⁹*Op. cit. supra* note 18 at 114.

With a few changes in phraseology, THE NATURE OF JUDICIAL PROOF (1931) by Michael and Adler, might be taken as a non-Euclidean work based upon wish-postulates.

⁴⁰Hogben, *op. cit. supra* note 18 at 215. See some wise words on this subject in Llewellyn, *Legal Tradition and Social Science* in *ESSAYS ON RESEARCH IN SOCIAL SCIENCE* (1931) 89, at 105. Cf. BERTRAND RUSSELL, *op. cit. supra* note 16 at 44, to the effect that the essential in scientific method is the "substitution of general laws based on evidence for fairy tales embodying a fantasy of wish-fulfillment."

⁴¹UTILITARIANISM c. V:

"To have a right, then, is, I conceive, to have something which society ought to defend me in the possession of. If the objector goes on to ask why it ought, I can give him no other reason than general utility. If that expression does not seem to convey a sufficient feeling of the strength of the obligation, nor to account for the peculiar energy of the feeling, it is because there goes to the composition of the

But although such confusion is understandable, it is none the less erroneous, deplorable and to be avoided. It is avoidable. Holmes has made that plain.

As previously indicated, the dozen or so American legal writers who make up the so-called sceptical or "realistic" legal movement are not in agreement among themselves. But, with possibly one or two exceptions, they are surely undeserving of a curious criticism recently directed against them. "They have been assailed as "positivists" who are exclusively devoted to whatever is now happening in the legal world, narrowmindedly restricting their attention to the existent, unwisely ignoring not only the ideals that affect the acts of men—including judges—but also the possibility of eradicating evils in the judicial process.

With all due respect to the distinguished American philosopher who has exploited that criticism, it is difficult to think of anything further from the truth. All those known as legal realists or legal sceptics are eager—perhaps altogether too eager—to improve the judicial system, to make it more efficient, more responsive to social needs, more "just", if you like that word. They are unflagging idealists disgruntled with the way the courts do their work; they are tireless critics of the existing ways.

sentiment, not a rational only but also an animal element, the thirst for retaliation; and this thirst derives its intensity, as well as its moral justification, from the extraordinarily important and impressive kind of utility which is concerned. The interest involved is that of security, to everyone's feelings the most vital of all interests. Nearly all other earthly benefits are needed by one person, not needed by another; and many of them can, if necessary, be cheerfully foregone, or replaced by something else; but security no human being can possibly do without; on it we depend for all our immunity from evil, and for the whole value of all and every good, beyond the passing moment; since nothing but the gratification of the instant could be of any worth to us, if we could be deprived of everything the next instant by whoever was momentarily stronger than ourselves. Now, this most indispensable of all necessities, after physical nutriment, cannot be had, unless the machinery for providing it is kept unintermittedly in active play. Our notion, therefore, of the claim we have on our fellow-creatures to join in making safe for us the very groundwork of our existence, gathers feelings round it so much more intense than those concerned in any of the more common cases of utility, that the difference in degree (as is often the case in psychology) becomes a real difference in kind. The claim assumes that character of absoluteness, that apparent infinity, and incommensurability with all other considerations, which constitute the distinction between the feeling of right and wrong and that of ordinary expediency and in expediency. The feelings concerned are so powerful, and we count so positively on finding a responsive feeling in others (all being alike interested), that *ought* and *should* grow into *must*, and recognized indispensability becomes a moral necessity, analogous to physical, and often not inferior to it in binding force."

But where they differ from others who seek to change court-house ways is in this important respect: They insist that no program for change can be intelligent if it is uninformed, if it is not based on moderately accurate knowledge of what has happened and is happening, and on informed guesses as to what can be made to happen. They believe that the way to attain ideals is not by merely assuming that those ideals are now operative or easily attainable, but by painstaking study of what is now going on (thereby learning something of what can be made to go on hereafter). If that is narrow-minded, then the writer does not know what narrow-minded means. If that *were* unidealistic, then he would be opposed to idealism. If rejection of muddle-headed wishful thinking based on delusions *were* unethical, then he would be glad to say that he is unethical.

V

ADDITIONAL LEGAL AXIOMS TO BE QUESTIONED

It may be helpful to set down a sample list of some of the other postulates which the writer believes should be questioned or abandoned:

1. The Truth-Will-Out Axiom

Perjury, bias and mistakes in testimony are infrequent, abnormal and when they occur are usually uncovered in litigation and therefore have little effect on the outcome of lawsuits or on legal rights and obligations.

Related postulates are: The true facts usually come out in a trial. Fear of prosecution for perjury prevents witnesses from deviating from the truth. The witnesses interrogated by an honest lawyer, never understand what he hopes to prove and never shape their stories accordingly. The crooked lawyer who coaches his witnesses seldom succeeds. Perjury and the coaching of witnesses are abnormal. Therefore, an honest lawyer usually can safely assume that he knows the facts of his client's case, and usually can predict that the judge (or jury) will believe that those are the facts of the case.

*Suggested Alternative Postulates*⁴²

Perjury, bias and mistakes in testimony are a normal part of many lawsuits. The true facts of a case are often not apprehended by judge or jury if the case is hotly contested and questions of fact are in issue. Fear of prosecution for perjury has small effect for several reasons: (a) Few persons are indicted for perjury; few perjurers can be convicted if indicted; and fewer still are convicted. (b) Perjurers are often heedless of possible future consequences. (c) Much false testimony is not the result of deliberate lying which would either justify or make possible conviction for perjury. Coaching of witnesses by crooked lawyers is often successful. Inadvertent coaching of witnesses by honest lawyers often occurs; it is an unavoidable result of the fact that witnesses, when interrogated by a lawyer in advance of trial, become aware of what the lawyer wants, if possible, to prove.

A lawyer, before the trial begins, is often not aware of all the facts of his client's case. And even if he does know all the true facts, he does not know what liars, biassed witnesses or mistaken witnesses will testify for the other side. And he cannot know whether false or mistaken testimony will be believed by the judge or jury. Wherefore, he cannot predict the outcome of any lawsuit before it has begun because he does not know what the testimony will be and what effect it will have. For perjured, biassed or mistaken testimony often persuades judges and juries.

2. The Axiom That Decisions Are Easily Criticized.

It is usually possible by examining the record to ascertain whether the facts as found by a judge and reported in his opinion are in accordance with the weight of the evidence. Therefore, it is usually possible to criticize a decision. The critic can learn the facts and can then devote himself to determining whether the judge used the correct rule of law and applied it logically to those facts.

Suggested Alternative Postulate

If a case is "contested"—if there is conflicting testimony as to a crucial fact-issue—then adequate criticism of the decision is unavail-

⁴²Cf. Frank, *loc. cit. supra* note 29 at 233-239. In order to save time, the writer, from this point forward, has referred to his own writings for statements of alternatives to the axioms criticised in this paper. Several other writers could be quoted

able because the "facts" of the case are not "objective" but "subjective." As the writer has said elsewhere:⁴³

"In a 'contested' case, if the evidence is in conflict, the judge's thoughts or guesses as to the facts cannot be challenged by a reference to the objective facts. Judge Jones may think the facts are *Q*, *R*, and *S*. If another judge, Robinson, had heard the evidence, he might reasonably have thought the facts were *T*, *U*, and *V*. Accordingly, if Judge Jones says that he thinks the facts are *Q*, *R*, and *S*, then no one can say that he is unreasonable in so thinking. The record will not help as a standard of objective truth, because it is impossible to tell from the record whether the judge properly or improperly disbelieved or believed some of the crucial testimony. As observed by the courts and great masters of evidence, conflicting testimony cannot be accurately weighed. 'The reasons for believing particular witnesses or particular testimony in preference to others cannot be defined,' said one court. 'There is no standard for the sufficiency of evidence to induce belief,' said another court. There are no means as yet discovered or likely to be discovered for ascertaining whether or to what extent the belief of a judge about the facts of a 'contested' case correspond to those facts as they actually occur. The difficulty of determining whether the judge's guess as to the facts does correspond to the actual facts is sufficiently difficult where the testimony appears in the form of a printed record. The difficulty is obviously still greater when the testimony which the judge has heard was oral as well as conflicting. For, as the courts have occasionally noted, the printed page omits the witness's tone of voice, the hesitation or readiness with which he gives his answer, and other like phenomena. Accordingly, *there is no yardstick for measuring the accuracy of a judge's finding of the facts in a 'contested' case.*

"Now remember that the judge's statement that the facts of the case are *Q*, *R*, and *S* means only that he thinks that the facts of the case are *Q*, *R*, and *S*. But *how are we to know whether he is reporting correctly what he thinks the facts are? We can determine the truth of his statement only by knowing what actually went on in his mind. But it is very difficult to determine what goes on in the mind of any man.* In the case of a witness on the witness stand, cross-examination and other devices are available which may tend to show the witness' lack of veracity or inaccuracies, and may bring to light what the witness is really thinking or really thought. *But cross-examination of judges is not permitted. If, then, (1) the judge's statement of 'the facts'*⁴⁴ of a 'contested' case

to substantially like effect with respect to some of these alternatives; see bibliography in (1931) 44 HARV. L. REV. at 1257.

⁴³Cf. Frank, *loc. cit. supra* note 30 at 660-662; see also 651 and 782-784.

⁴⁴For suggested terminology which may perhaps be substituted for "subjective" and "objective" see Frank, *loc. cit. supra* note 29, 248-251.

Of course, in some cases, the facts are stipulated or uncontroverted or admitted (as on demurrer); there the subjectivity of the facts disappears.

is a statement of what the judge thinks and (2) that statement cannot be challenged, it follows that it is only through a knowledge of the judge's 'character' or 'personality' that one can obtain criteria for determining the correctness of his conclusion. And, unfortunately, that kind of knowledge is seldom available. So that in a 'contested' case, the decision may be wrong, although the opinion makes it appear to be right. (I may add, parenthetically, that the opposite is also true, *i. e.*, the decision may be 'right' although the opinion makes it appear 'wrong'.⁴⁵) In a 'contested' lawsuit, then, it is more or less futile to criticize the judge's fact-finding. If the judge says that Jones hit Smith, or that Mrs. Moriarty called Mrs. Flanagan a liar, or that old widow Robinson was insane when she made her will, or that Wriggle used fraud in inducing Simple to sign a contract—the judge's word 'goes.' And the same would be true if in any of those instances the judge had found exactly the opposite to be the facts. The judge's decision in 'contested' cases cannot therefore be successfully challenged or criticized unless he happens to write an opinion. Even then, if his opinion is properly worded, he can and does avoid effective criticism of his decision. . . . Wherefore, a decision must often be accepted as sound, whichever way the judge decides. Wherefore, also, *most decisions in 'contested' cases are beyond criticism because the means of adequate criticism are not available.*"

3. *The Axiom That Exact Rules Make Decisions Predictable*

There is an observable correlation between (a) exact rules of property or contracts and (b) the predictability of future specific decisions in lawsuits relating to specific pieces of property or specific contracts. Commercial and industrial development makes for certainty. The commercial world demands and obtains definite legal rules divorced from judicial discretion. No man makes large investments trusting to the exercise of discretion by judges in deciding cases relating to the property or contracts in which he invests.⁴⁶

Suggested Alternative Postulate

It is doubtless true that, on the whole, the rules relating to "property" and commercial transactions are more exact than those relating

The word "fact" is, of course, highly ambiguous. A complete exposition would require a discussion of "legally relevant facts", "constitutive facts", etc. But the vague word "fact" is perhaps sufficient here.

It may be objected that the determination of the factual truth of a statement as to a judge's thoughts is different only in degree from the determination of the truth of many other kinds of statements of facts. But the difference in degree is often a vastly significant difference.

⁴⁵The effects of the "subjectivity of facts" on the judicial process can only be sketched in this paper; that theme will be developed in a book now in process.

⁴⁶This is a paraphrase of Pound's statement in *The Decadence of Equity* (1905) 5 COL. L. REV. 20, 24. And cf. DICKINSON, *op. cit. supra* note 7, 145-148.

to negligence or the obligations of fiduciaries.⁴⁷ But, as the writer has said elsewhere,⁴⁸

"In cases involving fee-simples, promissory notes and bills of exchange, it is always possible to introduce some *question of fact* relating to fraud, negligence, mistake, alteration or estoppel. In most contested cases, one side or the other usually injects such a question. Suppose such a case is tried before a jury and, on the question of fact, 'goes to the jury.' Is it not absurd to say that the rules will then be mechanically applied? Anyone who has ever watched a jury trial knows the rules become a mere subsidiary detail, part of a meaningless but dignified liturgy recited by the judge in the physical presence of the jury and to which the jury pays scant heed. To say that fixed rules govern property and commercial cases when the jury sits and decides is to deny the plain truth. The pulchritude of the plaintiff or his religion or his economic status or the manners of the respective attorneys, or the like, may well be the determining factor inducing the decision.

"And if a judge sits and decides without a jury and similar questions of fact are raised? Will the crystallized unalterable rules about identical fee-simples (or promissory notes) mechanically produce the decision? Surely not. Of course, if the judge writes an opinion, the stereotyped rules will appear in the opinion. But the judge will decide one way or the other on the 'facts' and those 'facts' vary with the particular case and with the judge's impressions of those 'facts'—although the instrument in suit is a promissory note precisely like every other promissory note.

"The truth is that the talk about mechanical operation of rules in property, or commercial, or other cases is not at all a description of what really happens in courts in contested cases. ('Contested' is here used to mean cases where conflicting testimony is introduced with respect to questions of fact.) It is a dogma based upon inadequate observation. For it fails to take into account the important circumstance that any future lawsuit about a piece of property or a commercial contract can be contested, and that, if it is contested, questions of fact can be raised involving the introduction of conflicting testimony. . . .

"The 'facts', as we have seen, may be crucial when, as is often the case, a question of 'fact' is injected into litigation involving a fee-simple. And those facts are, *inter alia*, a function of the attention of the judge. Certain kinds of witnesses may arouse his attention more than others. Or may arouse his

⁴⁷But as the writer has noted elsewhere, "they are often amazingly unsettled when one examines them close up. *The expert in any field is far less sure of the preciseness of the rules than one who examines them close up.* How many cases come to a bank's lawyer where, even assuming all the facts to be undisputed, he finds that the rules concerning commercial paper are wide open, despite (or perhaps because of) the Negotiable Instruments Law." ⁴⁸*Loc. cit. supra* note 29 at 32.

antipathies or win his sympathy. The 'facts', it must never be overlooked, are not objective.⁴⁹ They are what the judge thinks they are. And what he thinks they are depends on what he hears and sees as the witnesses testify—which may not be—often is not—what another judge would hear and see. Assume ('fictionally') the most complete rigidity of the rules relating to commercial transactions; assume ('fictionally') that decisions are products of fixed rules applied to the facts. Still, since the 'facts' are only what the judge thinks they are, the decision will vary with the judge's apprehension of the facts.

"So that, although one promissory note may be precisely like another, although the rules governing negotiability may be as rigid as a steel ingot, the decisions as to the rights of the holder of any given note and the duties of the maker of that note are not certain. To say that the law relating to commercial paper or deeds is clear, definite and certain is intolerably misleading as applied to what we have called 'contested' cases—unless you add at once that by 'law' you do not mean what judgment will be entered in any 'contested' lawsuit which may relate to any specific piece of commercial paper or specific deed, but that you mean merely that, when an opinion is written,⁵⁰ it will contain rules which will be virtually identical with the rules contained in an opinion delivered in connection with the decision of some other case involving another piece of commercial paper or another deed.

"The rules, that is, do not produce uniformity of decisions (judgments, orders or decrees) in what we have called 'contested' cases, but only uniformity of that portion of opinions containing the rules. Judge Alpha may try a 'contested' case relating to a promissory note and decide for the holder. If Judge Beta tried the same case he might decide for the maker. The opinion of Judges Alpha and Beta would contain identical rules. That, and little more, is what truth there is in the dogma about the non-uniqueness of promissory notes."⁵¹

4. The Axiom That Clear-Cut Rules Prevent Litigation

Simple clear-cut legal rules usually work automatically with the

⁴⁹The reference here is to the unique facts of the particular case, such as whether Jones paid his note or was induced by Smith's fraud to deliver it. There are other kinds of facts, *i. e.*, "background" facts, such as scientific or economic facts, which judges use in arriving at decisions. (The famous Brandeis-Frankfurter briefs are illustrative). Such "background" facts are more objective. See, however, even as to such facts, Radin's keen comment, Radin, *Statutory Interpretation* (1930) 43 HARV. L. REV. 863, 881, n. 35.

⁵⁰If the case is tried by a jury, then you mean that when the judge addresses the jury, his instructions—which the jury seldom understands and/or heeds—will contain rules virtually identical with the rules contained in equally unintelligible instructions which will be addressed by other judges in other cases involving other pieces of commercial paper or other deeds.

⁵¹As applied to "contested" cases.

finality and precision of a guillotine. They are therefore valuable as preventives of litigation.⁵²

Suggested Alternative Postulate

As the writer has said elsewhere:⁵³

“As to specific rules preventing litigation, the very opposite could be asserted far more plausibly. *There are excellent grounds for the contention that ‘direct specific rules of law’ provoke more litigation than they prevent.* The more simple a rule the more simple is the course of the ‘bad’ man. It is well known that whenever a new more or less specific rule about negligence is laid down by an upper court, the evidence introduced in many subsequent personal injury cases miraculously makes those cases fall squarely within the new rule.

“The very conciseness of a rule may be a boon to the bad man and the bad man’s ‘bad’ lawyer. *A precise rule may be a guide for coaching witnesses. It may furnish a perjury chart. It may canalize lying testimony.*

“The courts have had some glimmering of a not unrelated notion when they have refused to make a ‘direct specific rule’ as to what constitutes fraud and not-fraud, knowing that a crystallized formula of that kind would promote swindling. They have said that ‘were courts to cramp themselves by defining it (fraud) with a hard-and-fast definition, their jurisdiction would be cunningly circumvented by new schemes beyond the definition. Messieurs, the fraud-feasors, would like nothing half so well as for courts to say they would go this far and no further in its pursuit.’”

5. *The Axiom That Decisions Result From the Application of the
“Law” to the “Facts”*

In the process of deciding a case, the judge always first determines what are the facts, then finds and applies a legal rule and then reaches his decision.⁵⁴ Judges seldom, if ever, begin with their conclusion and work backwards to a statement of facts and a statement of the rule.

This axiom may be schematized thus: Let R = the legal rules; let F = the “facts” of any case; let D = the decision. Then $R \times F = D$. The judge first finds the F , then applies the appropriate R . By multiplying $R \times F$ he reaches his D .

⁵²See for this axiom Dickinson, *loc. cit. supra* note 29.

⁵³*Loc. cit. supra* note 29 at 238. The quotation is but an excerpt. See more at length *id.* 236 to 241.

⁵⁴Cf. DICKINSON, *op. cit. supra* note 7, 143; Pound, *The Theory of Judicial Decisions* (1923) 36 HARV. L. REV. 940.

Suggested Alternative Postulate

As the writer has suggested elsewhere.⁵⁵

"Talks with candid judges have begun to disclose that, whatever is said in opinions, the judge often arrives at his decision before he tries to explain it. With little or no preliminary attention to legal rules or a definite statement of facts, he often makes up his mind that Jones should win the lawsuit, not Smith; that Mrs. White should have the custody of the children; that McCarthy should be reinstated as keeper of the dog pound. After the judge has so decided, then the judge writes his 'opinion.' The D has been fixed. The judge's problem is now to find an R and an F that will equal this already-determined D.

"The judge's opinion makes it *appear* as if the decision were a result solely of playing the game of law-in-discourse. But this explanation is often truncated, incomplete. Worse, it is frequently unreal, artificial, distorted. It is in large measure an after-thought. It omits all mention of many of the factors which induced the judge to decide the case. Those factors (even to the extent that the judge is aware of them) are excluded from the opinion. So far as opinions are concerned, those factors are tabu, unmentionables.

"Opinions, then, disclose but little of how judges come to their conclusions. The opinions are often *ex post facto*; they are *censored expositions*. To study those eviscerated expositions as the principal bases of forecasts of future judicial action is to delude oneself. It is far more unwise than it would be for a botanist to assume that plants are merely what appears above the ground, or for an anatomist to content himself with scrutinizing the outside of the body. . . . A member of an upper court once told me that the chief justice said to him after the oral argument of a case, 'We'll have to lick that plaintiff somehow and it's up to you to find some theory and authorities that will help us to it.' The chief justice of another important upper court recently wrote to a friend of mine that in his court it was the usual practice for the judges first to determine the 'abstract justice' of a case and then to examine the 'law.'

"How then does a judge arrive at his decision? In terse terms, he often does so by a 'hunch' as to what is fair and just or wise or expedient. So we have recently been advised by one of our ablest federal judges, Hutcheson.⁵⁶ The lawyer's task, then, becomes this: The determination of what produces the judge's hunches. What, then, does produce the judicial hunch? The answer must be vague: The effect of innumerable stimuli on what

⁵⁵*Loc. cit. supra* note 30 at 653, 655, 656. See also FRANK, *LAW AND THE MODERN MIND*, 100ff.

⁵⁶Hutcheson, *The Judgment Intuitive: The Function of the "Hunch" in Judicial Decisions* (1929) 14 *CORNELL LAW QUARTERLY* 274. It should be said that Judge Hutcheson values the jury highly and, generally speaking, considers somewhat excessive such views on the judicial process as those expressed in this paper.

is loosely termed 'the personality of the judge.' If you have a liking for mathematical formulas you can let S be the stimuli, P be the judge's personality, D be the decision; you can then say ' $S \times P = D$.'

" 'The personality of the judge' is a phrase which too glibly describes an exquisitely complicated mass of phenomena. The phrase 'judicial hunch' is likewise beautifully vague. But those phrases will do for present purposes. Be it noted then that 'the personality of the judge' and the 'judicial hunch' are not and cannot be described in terms of legal rules and principles.⁵⁷ They are therefore not recognized or referred to by formal law—except in jocular asides or allegedly humorous footnotes. . . . The judicial hunch does not separate out the F and the R . The hunch is a composite reaction of a multitude of responses to the stimuli set up by witnesses—stimuli which encounter the judge's (or jury's) biases, 'stereotypes,' preconceptions, and the like. On all this, formal law is silent. This silence makes formal law hopelessly inaccurate and accounts for the smug confidence of its devotees. . . . in the measurable certainty of the judicial process."

6. Axiom that Juries Are The Best Fact-Finders

Juries are better able than judges to determine the true facts of cases.⁵⁸

Suggested Alternative Postulate

Twelve men, casually selected and utterly untrained in any technique of listening to and watching witnesses and lawyers, are less expert as fact-finders than even a mediocre judge. Indeed, it is scarcely possible to devise a more inefficient mode of "finding the facts" than a jury trial, for there distorting emotions and prejudices operate at their maximum.⁵⁹

⁵⁷The same is true of the innumerable external stimuli which activate the judge's personality and yield the hunch. In the equation $S \times P = D$, both S and P are the loosest of loose symbols.

⁵⁸*Cf.* Cooley, J., in *People v. Garbutt*, 17 Mich. 9, 27 (1868): "The jurors, and they alone, are to judge of the facts and weigh the evidence. The law has established this tribunal because it is believed that, *from its numbers, the mode of their selection, and the fact that the jurors come from all classes of society, they are better calculated to judge of motives, weigh probabilities, and take what may be called a common-sense view of a set of circumstances involving both act and intent, than any single man, however pure, wise, and eminent he may be.*"

⁵⁹This postulate will be found in expanded form in *LAW AND THE MODERN MIND* 170-185.

7. *Axiom That Juries Best Determine Questions of Policy*

Juries are better able than judges to determine questions of policy.⁶⁰

Suggested Alternative Postulate

The jury is perhaps valuable at times as a political shock-absorber.⁶¹ But too much has been made of that notion. The folly of the axiom in question can be demonstrated in this way: If it were carried out to its logical conclusion, the result would be that the judge would find the facts—for which he is far better trained than the jury—and the jury would then decide the case on the basis of the facts as found by the judge, thus reversing the traditional conception of the division of labor between judge and jury. This is a result which most persons would concede to be absurd.

8. *Axiom That Juries Do Not Decide Cases*

Juries do not decide cases or determine the legal rights of litigants.

The suggested alternative postulate (which the writer has more elaborately discussed elsewhere)⁶² is to the effect that legal rights are often determined by juries.

9. *Axiom That All Judges Are Honest, Intelligent and Always Attentive to All the Evidence*

All judges are honest. Comparatively few judges are ever prejudiced. Very few judges fail to listen attentively to the evidence.

The suggested alternative postulate (which the writer has discussed more at length elsewhere) runs thus: Unfortunately, some judges are dishonest. All men, and therefore many judges, have prejudices. Many judges are insufficiently aware of their own prejudices to be able constantly to overcome the worst effects of those prejudices. The best of judges are not always alert when listening to and observing witnesses.⁶³

⁶⁰Cf. DICKINSON, *op. cit. supra* note 7, 151, 317.

⁶¹Cf. GREEN, JUDGE AND JURY (1930) 376. That it will not do to make too much of that notion, see FRANK, LAW AND THE MODERN MIND (1930) 176 and note.

⁶²LAW AND THE MODERN MIND 170-185.

⁶³See Frank, *loc. cit. supra* note 29 at 33-36, 48, 240-241, and *loc. cit. supra* note 30 at 766-768, 770 to the effect that it is absurd to ignore judicial incompetence and dishonesty on the mistaken ground that they are "abnormal".

10. *Axiom That Law Students and the Laity Should be Misled as to Legal Certainty*

Both law students and the laity should be made to believe that the judicial process is more smooth, more certain, more regular and more just in its results than it actually is.

The suggested alternative postulate, discussed elsewhere,⁶⁴ is too obvious to require statement here.

11. *Axiom That the Apprentice System of Training Law Students Has Been Proved Unsound*

The apprentice system of teaching future lawyers has been proved to be fundamentally unsound.

The suggested alternative postulate takes the form of an emphatic negative.⁶⁵

12. *Axiom That Upper Courts are Inherently Better Than Lower Courts*

Usually an upper court can and does decide a case more correctly than a lower court. If upper courts were abolished our legal system would be hopelessly impaired.

The suggested alternative postulate, briefly discussed elsewhere,⁶⁶ is to the effect that far too much has been made of the work of the appellate courts, that the trial court is and should be recognized as the pivotal point in our legal system, and that if the importance of the trial court were recognized, there would be far greater likelihood that more lawyers of ability, intelligence and probity could be induced to take positions as trial court judges.

VI

PRACTICAL CONSEQUENCES OF NEW LEGAL AXIOMS

It has been mentioned before that one of the benefits of revising and simplifying postulates is that the deductions from the revised and simplified postulates often point the way to the possibilities of new observations and new techniques. New and simplified postulates implicate subsidiary propositions theretofore not conceived. They

⁶⁴LAW AND THE MODERN MIND *passim*; *loc. cit. supra* note 29 at 48-49, 253-254; *loc. cit. supra* note 30 at 779-781.

⁶⁵See Frank, *loc. cit. supra* note 29 at 259, n. 75; *loc. cit. supra* note 30 at 779-780.

⁶⁶*Loc. cit. supra* note 29 at 242; GREEN, JUDGE AND JURY (1930) 394. This postulate will be expanded in a book by the writer which is now in process.

stimulate. Their extrapolations often prove unexpectedly fruitful.⁶⁷

As yet non-Euclidean or postulational legal thinkers have been too busy revising and simplifying their postulates to devote much time to all the implications of their new assumptions. But the promise is abroad of novel and valuable implications.

Thus the writer thinks that the new postulates will lead to a discovery of the transcendent importance of finding the "facts" in "contested" cases and the inherently subjective nature of the so-called facts of any "contested case" (*i. e.*, a case involving conflicting testimony). The implications will, he believes, suggest radical modifications—in legal pedagogy and in court procedure.⁶⁸

VII

AN APOLOGY FOR ANY LEGAL THINKING IN THESE TROUBLED DAYS

Thanks to Holmes, we are now able quite consciously to develop non-Euclidean or postulational legal thinking. There have been gropings in that direction before now. Those who advocated the exclusively economic interpretation of all decisions were surely attacking—and justifiably—some of the fundamental postulates of the old jurisprudence. But they were unwilling to examine their own assumptions. They were for ousting one set of sacred or tyrannical axioms in order to install another such.⁶⁹

These are sad days in the history of our civilization. The failure to recognize the true relations of economics and politics has led to economic disorganization which has brought misery to millions of people. No wonder that men like Laski grow impatient with those who refuse to acknowledge the extent to which economics affect and should affect all governmental processes, including the judicial. And one needs indeed to apologize for now discussing legal or any other problems that have no bearing on the world's economic ills.

But, however the world goes, judicial processes will be as necessary as food. Disputes will arise in any society, whatever its form. And those disputes which men cannot settle between themselves must be settled by some tribunal or the society, if at all complex, will cease to exist. Unsettled conflicts between men—individually or in groups—will arise in Soviet Russia as they did in ancient Egypt, as they do in

⁶⁷Cf. KEYSER, *loc. cit. supra* note 10, 64-65; LEWIS, *loc. cit. supra* note 11 at 13.

⁶⁸Briefly indicated in the writer's papers cited *supra* note 29 at 242, 253-260, and *supra* note 30 at 778-781. These points will be developed in a book by the writer now in process.

⁶⁹So, too, their cousins, the "sociological" jurists. Cf. Radin, *loc. cit. supra* note 49, 881, n. 35, and FRANK, *LAW AND THE MODERN MIND* 105 n.

modern Turkey or contemporary New York. No economic reorganization of society will do away with the need for some kind of court. Doubtless the kinds of disputes will change; doubtless, too, the economic pressures on judges—direct and indirect, conscious and unconscious—will be of a different character. But even if all such economic pressures are removed, even if we attain a world as homogeneous and stabilized in its way as was the old China in its time, nevertheless quarrels and disagreements calling for judicial settlement will unavoidably continue to occur. No millennial change in economic structure will do away with all forms of the judiciary any more than it will eliminate agriculture.

In other words, there seem to be in the very nature of social organization some recurrent problems⁷⁰ of the ways of judges⁷¹ in settling disputes.⁷²

Holmes made possible a clear-eyed study of those problems. He paved the way for the overthrow of all legal dogmatism. He gave legal thinking a wholly new orientation. He secularized legal axioms. Did he not say, "To have doubted one's own first principles is the mark of a civilized man"?

APPENDIX I

A NON-EUCLIDEAN ACCOUNT OF CHANGES IN ASTRONOMICAL THEORY

Consider what happened in astronomy. There is an old and a new way of telling the story. The old version runs thus: The Greeks had a considerable knowledge, based upon observation, of the movements of the planets. They evolved an explanatory mechanism (known as Ptolemy's system) which started with a number of "self-evident truths" from which there were deduced propositions or "laws" which

⁷⁰In that sense there may perhaps be some few discoverable fundamental legal axioms which are almost universally true. For in every society, if at all complex, disputes arise which, if not settled by the parties, will cause bloodshed and social disintegration. *The settlement of these disputes by somebody acting for the social group is the judicial process.* See Frank, *The Citizen and His Law*, a speech before the League for Industrial Democracy, March 21, 1931.

⁷¹That some form of judiciary is probably necessary in any complex society but that lawyers are sometimes dispensable, see Tarde in WIGMORE AND KOCOUREK, *EVOLUTION OF LAW* (1915) II, 704.

⁷²The error in the 100%-economic-interpretation-of-decisions postulates is that they are too restrictive. This defect they share with Machiavelli's postulates. And for much the same reason. It was Machiavelli's passion to save his country which caused him to warp his description, as it is the 100% economic interpretationists' passion for social justice that warps their description. The reason for the warping is understandable, but that does not explain it away.

accorded with and explained the observed facts. These self-evident truths were that the earth is the center of the universe and that, around the earth, the sun and moon and the planets revolve in perfect circles. The nearby or "inferior" planets, it was explained, revolve uniformly in small circles which are always in the line joining the earth and the sun. But the retrograde motion of the outer or "superior" planets could not be so explained. Accordingly, Ptolemy stated the scientific law that the outer planets revolve uniformly in small circles whose centers travel uniformly in large circles around the earth; the small circle was called an epicycle and the large circle a deferent. The Ptolemaic system of axioms and laws needed more and more complicated elaboration to make it jibe with the observed facts, necessitating the discovery of no less than 79 epicycles.

For eighteen centuries astronomers accepted as self-evident truths the Ptolemaic system of axioms and laws. The system was cumbersome. It is told of a Spanish prince that he remarked to his tutor, "If I had been present when the universe was made, I should have seen that it was made much more simply." But however cumbersome, this system satisfactorily linked the observed phenomena with the self-evident truths. But after eighteen centuries, Tycho Brahe observed that the position of Mars differed from that required by the Ptolemaic system by an amount as great as eight minutes of an arc. "Out of those eight minutes", said Kepler, "we will construct a new theory that will explain the motions of all the planets." Kepler and Newton made good on this promise. The axioms of Ptolemy were discarded. The Newtonian system was accepted in place of the Ptolemaic because, with far greater simplicity and exactness, it explained the observed facts. But subsequently new observations were made by Leverrier of the orbit of Mercury which did not jibe with the logical deductions from the basic axioms of the Newtonian theory. New subsidiary or adjusting laws were devised. But they were highly complicated and therefore unsatisfactory. And recently Einstein's axioms, logical deductions from which accurately coincide with astronomical observations, were announced and are now largely accepted. As Jeans puts it: "Just as Tycho's eight minutes of arc, in the hands of Kepler and Newton, revolutionized medieval conceptions of the universe, so Leverrier's 43 seconds of arc, in the hands of Einstein, has revolutionized our 19th Century conceptions, not only of purely astronomical mechanism, but also of the nature of time and space and of the fundamental ideas of science."

Now in the light of the notion behind non-Euclidean geometry, that story can be re-told thus: There never were any self-evident

truths at the basis of the Ptolemaic system. Ptolemy's axioms were postulates or assumptions. Other assumptions were conceivable. But as long as from the Ptolemaic assumptions men could work out deductions which clicked with the observed facts, there was no pressing necessity of making new assumptions. To be sure, some alternative postulates might have explained more simply the facts known to Ptolemy; the Copernican heliocentric postulate did make some limited headway, even prior to Kepler, because it did just that job. But the effective onslaught on the Ptolemaic assumptions came with the discovery of new facts, the explanation of which, on the basis of the old assumptions, required excessively complicated adjustments of the old assumptions. And so Einstein's suggested alternatives to the Newtonian assumptions have been accepted because the newly observed facts could be explained on the Newtonian assumptions only by the addition of excessively complicated adjusting assumptions.

APPENDIX II

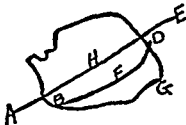
SOME APPOSITE SCIENCE BED-TIME STORIES

Swann has given a delightful vignette of the struggle between the orthodox Newtonians and the adherents of Einstein.⁷³ Suppose, he says, that the figure shown in the footnote⁷⁴

"represents a crater with a house H in the middle, and that a traveler sets out to go from A to E by the shortest path. He will not necessarily pursue the path $ABHDE$ leading down to the bottom of the crater, and through the house, because that may be too long. Nor will he necessarily go by the path $ABGDE$, because that may be too long. By taking some such course as $ABFDE$ crossing the crater part of the way down, it is possible that he will find a path shorter than any other, and this is the path he will take. Suppose now that while this is true, we know nothing about it, and that we find ourselves seated high up in an airplane watching the spectacle. Of course, we shall not see the crater as such; everything will appear flat. We shall see the traveler going from A to E , and shall wonder why he does not go straight across and through the house. If I have been taught in my youth that a body moves in a straight line unless a force acts on it I shall conclude that the house repels him. Having come to

⁷³*What is Science* in *ESSAYS IN RESEARCH IN THE SOCIAL SCIENCES* (1931) 21.

⁷⁴



this interesting conclusion, I shall ponder over the reason why the house repels him. Possibly I shall receive a sudden inspiration which will lead me to believe that the house contains a man who is provided with a hose which he plays on the traveler, compelling him to keep away from his property. I may be able to describe the traveler's path very accurately in terms of the hose. . . . Now suppose that you should bring me some observations which show that the motion of the traveler was not exactly what we thought it was. The difference might be very slight, but it might be of such a nature as to upset completely the simplicity of the action which I had imagined as going on by virtue of the hose. Of course, I shall first cling to the hose, but shall modify it slightly. I shall say, 'Naturally this is no ordinary kind of hose. Possibly it does not push entirely in the direction in which the stream of liquid travels', but I shall have to face the situation that while the discrepancies may be small in amount they may be large in principle, and involve such radical alterations in my notions of the mechanism of the process that the hose which I shall have to picture will be radically different from any hose which I have ever seen. I shall go on in this way, modifying and adjusting the hose, making it more and more difficult to understand; and forgetting that the original justification for its introduction was its apparent power to explain what was observed in terms of something which I thought I knew all about. I shall soon be in the position of expending 99 per cent of my ingenuity in trying to understand the hose, leaving only 1 per cent for the law of the traveler. Now suppose that, while I am doing this, and am feeling rather disheartened with my success, you should come to me and say, 'I have made a discovery. I do not know why the traveler moves as he does. Neither, I think, do you, but I have found exactly how he does move. He is moving from *A* to *E* by a path which is the shortest distance between those two points, not as the crow flies, but across a crater whose form I can describe to you in a very elegant way, and which appears to play a very important part in a lot of other phenomena going on down there—the direction which that little stream takes for example.' Suppose you should say this, and should add: 'Now I am going to take this statement of the law as my starting point. If there is to be any hose in the matter, it is the hose which is going to be explained in terms of this fundamental law, and not the fundamental law in terms of the hose.' I think I should have to admit that your attitude was at least reasonable. It is a change of viewpoint of this kind to which we have to adapt ourselves in passing over from the Newtonian description of motion to that adopted in Einstein's theory of gravitation."

Let us, so to speak, turn Swann's hose on Pound and Dickinson. Then we shall say: Stop expending 99 per cent of your first-rate ingenuity trying to understand the nature of so-called legal rules, leaving yourself only 1 per cent for understanding concrete judicial

decisions made by human beings called judges. Explain your so-called rules in terms of those human decisions, and not those human decisions in terms of those so-called rules. Then your so-called rules will be seen to occupy, frequently, a minor position as a mere part of the speech-ways of judges and lawyers.

One more science bed-time story is apposite here. In Galileo's famous *Dialogues*, Simplicius, who represents the traditional views, advances

“two most convincing arguments to demonstrate the Earth to be most different from the Coelestial bodies. First, the bodies that are generable, corruptible, alterable, etc., are quite different from those that are ungenerable, incorruptible, unalterable, etc. But the Earth is generable, corruptible, alterable, etc., and the Coelestial bodies ingenerable, incorruptible, unalterable, etc. Therefore, the Earth is quite different from the Coelestial bodies.”

Galileo made scientific history, paving the way for Newton, when he swept aside that argument. The earth and sun and other celestial bodies were, he said, fundamentally alike, being mere bits of matter. If the earth was generable, corruptible and alterable, then so were the celestial bodies. That, says Whitehead, was the “first great physical synthesis.” Shall we not adopt a somewhat similar psychical synthesis applicable to lawyers and judges? Shall we not say that, if judges are still to be called celestial and lawyers earthly, yet they are all equally generable, corruptible and alterable,—all human beings, for better or for worse?