A HOLISTIC APPROACH TO THE EXAMINATION

AND ANALYSIS OF EVIDENCE

in

ANGLO-AMERICAN JUDICIAL PROCESSES

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ACKNOWLEDGEMENTS

To Mahasin and our Family

ABSTRACT

This thesis is divided into three parts.   Part I provides
a critique of the dominant approach to the analysis and
examination of evidence in Anglo-American writings.   The
critique consists in showing that the dominant approach, on
account of its atomism, does not capture the complexity of
judicial fact-finding tasks or codify intuitive judgments about
them.   Recent attempts offering either mathematical or
inductivist structures for the analysis of judicial evidence
are explained and criticized as a resurgence of interest
in atomistic analysis.   Part III identifies a non-atomistic
body of thought outside the mainstream of the dominant tradition.
This body of thought is used as the starting-point for
developing a holistic approach to the examination and analysis
of evidence in Anglo-American judicial processes.

INTRODUCTION

A.   The term evidence as used in this thesis.

This thesis proposes a holistic approach to the examination

and analysis of evidence in Anglo-American Judicial processes.   The

subject of evidence within the discipline of law has generally been

conceived by most scholars as dealing with the rules of law which

deal with the problems of evidence.   Other evidence scholars such

as Bentham, Wigmore and Twining have taken a broader view of the

subject in which the law of evidence is seen to be merely one subject

in the field.[1]   However the greater part of evidence scholarship in

the Anglo-American tradition consists mainly in the exposition,

explanation, classification, analysis and critique of evidence rules

and their applications.   The study of the history of the evidence

rules, their justification and the search for a single underlying

principle for their rationalisation is another important area of

activity within this tradition.[2]

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1.   For Bentham and Wigmore see chs. 2 and 3 respectively; W. Twining: ":
Rationalist Tradition of Evidence Scholarship" in Louis Waller and
Enid Campbell (eds.), Well and Truly Tried (1983), p 211.   The article
forms part of a general thesis advocating a broadened approach to the
study and teaching of evidence discussed by the author in the following:
"Good-bye to Lewis Eliot" (1980) J.S.P.T.L. (N.S.) 9;   Bentham on
Evidence (forthcoming):   Wigmore on Proof (forthcoming):   "Some
Scepticism about some Scepticisms I" (1984) 11 J.S.Soc. 137;   "Some
Scepticism about some Scepticisms- II" (forthcoming); "Taking facts
Seriously" in N. Gold (ed.), Essays on Legal Education (1982), p 51;
"Identification and Misidentification: Redefining the Problem" in
Sally Lloyd-Bostock and Brian Clifford (eds.), Evaluating Witness
Evidence (1983), p 255;   Analysis of Evidence (forthcoming);   "Debating
probabilities" (1980) 2 Liverpool Law Review 51;   "Evidence and Legal
Theory" (1984) 47, M.L.R. 261,

2.An example of the study of the history of the rules of evidence for
the purpose of their explanation and distinction as pure legal rules
is J. B. Thayer, A Preliminary Treatise on Evidence at the Common Law
(1898);   examples of attempts to find an underlying explanatory
priciple are: Gilbert's Best Evidence Rule and Stephen's principles
of relevancy.   For Gilbert see ch. 1;   see ch. 3 below for Stephen.

The term evidence as used in this thesis means facts and
reports about facts which a fact-finder in a legal trial is entitled
to receive and is required to evaluate before he reaches a decision
on the existence of other facts which are necessary for the application
or otherwise of substantive legal rules.   The analysis of evidence
in this conception of it has been attempted by most evidence scholars
and the participants in the current probability debates.   However,
the literature relating to facts and reports about them has remained for
a considerable time an integral part of scholarly concerns about
evidence, but it has been overshadowed by the dominant concern and
interest in evidence as a system of legal rules.   The need for the
identification and study of proof as a separate and distinct subject
was expressed by Wigmore in his <u>Science of Judicial Proof</u>.[3]   He
stated:

> The study of the principles of evidence, for a lawyer,
> falls into two distinct parts.   One is Proof in the
> general sense, - the part concerned with the ratiocinative
> process of contentious persuasion, - mind to mind,
> counsel to Judge or juror, each partisan seeking
> to move the mind of the tribunal.   The other part
> is Admissibility, - the procedural rules devised by
> the law, and based on litigious experience and tradition,
> to guard the tribunal (particularly the jury) against
> erroneous persuasion.   Hitherto, the latter has
> loomed largest in our formal studies, - has, in fact,
> monopolized them; while the former, virtually ignored,
> has been left to the chances of later acquisition,
> casual and empiric, in the course of practice.[4]

An appraisal of Wigmore's and other similar attempts in the
rationalist tradition shall be deferred until the central problems
of judicial proof have been stated in the next section.

B.   <u>Towards a rational theory of judicial proof.</u>

(1)   <u>The central problems stated:</u>

The study of judicial proof extends over a vast spectrum

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3.   1913-37.

4.   <u>Ibid.</u> p 3.

of interrelated disciplines, e.g. philosophy, the philosophy of logic, methodology of science, forensic science, psychology and probability theory. It follows that a proper study of the subject of judicial proof should take into account its interdisciplinary nature. Judicial proof has also another interdisciplinary feature which does not only add to its complexity as a field of study but also singles out another complexity which relates to its tasks and the operations connected with them. The feature in question relates to the problems which evidence poses for the fact-finder in typical trial contexts. Individual items as well as the total mass of evidence in most types of case in legal trials involve determinations of logical, epistemological, methodological, empirical and pragmatic problems. Important examples of such problems are those concerned with relevance; the existence or non-existence of relevant facts (probability of the existence of facts); the problem of the probative value of evidence; the methodology to be adopted for such inquiries; and finally the sufficiency of evidence to establish the matter to which it relates. The contentious nature of litigation creates a further complexity discernable in the presence in most cases of conflicting and contradictory evidence which demands a process of elimination within the total mass of admitted evidence. The manner in which parties in litigation are allowed to introduce evidence for the consideration of the fact-finder is another complicating factor in the judicial fact-finding process. The existence of two requirements of proof in judicial inquiries - one deals with the proof of facts in issue - the other with the proof of substantive legal rules from those facts in issue, is a further complicating factor·in the trial process.

A theory of proof as a logistic system for the character-ization of judicial fact-finding tasks and the processes connected

with the performance of those tasks, should seek to capture the
complexity of the task.   It should do so by attempting to codify
the intuitive conception of the task and that of its performance.
This thesis uses the above criterion to determine whether or not
a theory of judicial proof satisfying to a greater or lesser extent
this criterion exists in the Anglo-American tradition.   The
investigation starts with the dominant approach in the literature
as exemplified in the writings of some leading scholars i.e.
Gilbert, Bentham, Stephen, Wigmore and some participants in the
current probability debates.   The investigation is further carried
outside the main stream of that tradition to identify the early
beginnings and the emerging thought of what I termed the holistic
approach.   The holistic approach is developed into a theory which
aims to satisfy the above criterion.

(2)   The dominant approach to the analysis of evidence in
         Anglo-American judicial processes.

The study of the logical dimensions of evidence and proof
has tended to concentrate on the logical analysis of evidence
as simple propositions.   The works of Gilbert, Bentham, Stephen,
Wigmore, deal with this aspect in differing degrees and with
differing emphasis.   The current probability debates and in
particular those centring on Jonathan Cohen's book The Probable
and the Provable (1977) constitute a more advanced treatment of
the same aspect with an emphasis on a search for criteria of
assessment.   While formal logic is important for the classification
and analysis of the formal structures of evidence and the construction
and appraisal of arguments about questions of fact, e.g. problems of
relevance, it has very little to offer for the solution of many problems
of evaluating evidence.   Formal logic helps the trier of fact to
determine the logical relationship between propositions, when the

legal rules and other devices have narrowed down the field of
inquiry, but it does not help him to determine the probative value
of evidence, or reach one particular inference rather than another.
The emphasis on the logical aspect of judicial proof in the dominant
body of literature in the field tends to overlook the other aspects
of the subject and its processes and this obscures its complexities
and their corresponding intuitive conceptions, and judgments about
them.   The following problems received very limited attention in
that literature.

(a)   The empirical base of evidence reports.

One of the basic problems which an evidence report poses
for a fact-finder is the validation of its empirical warrant.   The
probability of a fact is distinct from its probative force or
inferential value.   In a trial context the two questions should
be clearly distinguished since a valid inference presupposes the
determination of the existence of the facts on which it is based.
The validation of evidence reports is an empirical matter which
should not be subjected to an inferential logical analysis.   The
mathematical Baysian approach tends to confuse these two matters
(the empirical and the logical).   The inductivist analysis is
concerned mainly with the nomological inferential laws (Common
Sense Generalizations).

(b)   Atomistic and sequential validation:

The rationalist analysis assumes that each proposition
constituting a single line of proof, is asserted by the court
(believed or disbelieved) at a time when the whole evidence in the
case is not heard.   The same assumption is made with regard to
inferences from one proposition to another in the same line of
proof.   The relationship of the process to the trial complexity

in which this mental activity takes place is generally overlooked. This will be shown to be a major defect in the conception of the trial and proof processes. As regards inferences from one proposition to another in the same line of proof, the trier of fact, in the light of the traditional treatment, is represented as making these inferences in isolation from the other propositions in different lines of proof, or let us say, the other evidence in the case, and because of that his inferences can at best be only probable. The result of this approach and way of looking at the trial and proof processes is a collection of dissected and unrelated inferences which must be looked into by the trier of fact, at the end of the process, to see if they add up to a probable result which satisfies the standard of proof. Some specific criticism in that direction can be made against these assumptions in the following.

(i)   It can be assumed that no rational being who has partial information, (a typical situation is the beginning of a judicial trial) and knows that more evidence is forthcoming, ought to commit himself to any sort of belief on that information. The order in which evidence is presented in a judicial trial of an issue of fact renders "complete" information before the whole evidence is concluded, an impossibility.

(ii)   The interdependence, in point of time, place and circumstance, of the constituent elements of a single occurrence requires, when we are ultimately concerned with the proof of the existence or non-existence of that occurrence, the viewing of the totality of the elements involved in order to pronounce a judgment as to the existence or non-existence of the occurrence.

(c)   An item-by-item analysis of the evidence:

An item by item analysis of the evidence does not reveal the existence, in most types of legal case, of a process of elimination of most of the admitted items of relevant evidence. Some items, for example, may be eliminated because the facts to which they relate are not believed by the fact-finder to exist within the spatio-temporal region in which they are alleged to have occurred. Validated items may further be eliminated from consideration because they lack probative force in the context of a particular trial and the other validated items. Even items which are accepted as true by the fact-finder and found to be probative may fail to prove the proposition to which they relate for lack of a spatio-temporal link with the occurrence to which they relate. The obscurity of this process of elimination in the dominant body of literature on evidence is probably responsible for the oversimplistic analysis of the recent probabilistic treatment   of judicial proof by both Baconians and Pascalians. A good example of this is the assumption of transitivity in situations where non-transitivity can easily be pointed out.

(d)   The internal point of view of the fact-finder

Finally, a trier of fact who reaches his decision after hearing the whole evidence in the case, in the manner indicated above ought to be morally certain, if that is what is expected of him, that his finding coincides with the existence or non-existence of the occurrence as the case may be. But doubt, which is generally associated with the certainty - probability dichotomy in relation to knowledge when we reflect on the possibility of knowing in the abstract, is excluded from the particular mind of the trier of fact in the particular investigation of the particular occurrence on the particular evidence.

The consciousness of the trier of fact of the certainty of his beliefs tends to be ignored in this respect.

To say this is not to deny the utility of the traditional body of learning on the non-logical aspects of the problem. Hardly any thought on the subject from Gilbert downwards is destitute of ideas which can be utilized. But many of these ideas are vague and inarticulated.

C.   The Intellectual Sources of the Atomistic Approach

The aforementioned account is true of the dominant approach to the analysis of evidence in the Anglo-American tradition. I call this the atomistic approach.

The establishment of the basic defects of the atomistic approach calls for a careful investigation of its intellectual history and the establishment of a linkage between the tradition and the philosophy or philosophies in which it is grounded. It also demands establishing a link between the atomistic approach and the philosophical sources of Anglo-American evidence scholarship. The first link has already been established by Professor William Twining in a recent paper that starts with a brief historical and analytical survey of the highlights of the work of some Anglo-American writers on evidence, notably Gilbert, Bentham, Evans, Phillipps, Starkie, Will, Best, Greenleaf, Taylor, Burrell, Appelton, Stephen, Chamberlayne, Thayer and Wigmore.[5] Twining argues that all these writers belong to a single intellectual mainstream that he refers to as 'the rationalist tradition of evidence scholarship'.[6] These scholars share 'an underlying

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5.   W. Twining, "The Rationalist Tradition" op.cit. pp 211-242.

6.   Ibid. p 242.

theory that may be characterised as optimistic rationalism'.[7]

He points out certain disagreements, strains and controversies

among these scholars, but concludes that despite these disagree-

ments they all show a remarkable homogeneity with regard to 'logical

and epistemological assumptions about fact-finding in adjudication'.[8]

The basic assumptions of that tradition which Twining restates and

which are pertinent to the questions under discussion can be

summarized as follows:[9] the implementation of substantive laws

depends on the determination of the truth about allegations of facts

which, in a rational system of adjudication, must be based on

relevant evidence presented to the fact-finder.   But since events

and states of affairs occur independently of human observation,

and the fact-finder was typically not a witness of those facts at

the time they occurred, he can only decide, rationally, on reports

about those facts.   The truth of such reports consists in their

correspondence to the events and states of affairs they report.

The fact-finder, not being a percipient witness of the reported

occurrence, cannot determine whether it existed as reported or not

with absolute certainty.   This does not, however, mean that present

knowledge about past facts is not possible in principle;   yet

'knowledge' in this context means warranted beliefs that satisfy

specified standards of proof relating to the truth of statements

about facts.   The conclusions which this type of 'knowledge'

affords are not certain conclusions.   The term probability is

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7.   Ibid. p 247.

8.   Ibid. p 243.

9.   Ibid. pp 244-9.

used in this context to refer to judgment about the truth of allegations about past events that fall short of certainty. Given that the application of substantive laws is necessarily dependent on determinations of allegations of facts the truth of which cannot be established with certainty, it follows that 'justice under the law must be satisfied with standards of proof falling short of absolute certainty'. Such judgments must be based on 'the available' 'stock of knowledge' about the common course of events in the external world. The stock of knowledge necessary for probability judgments exists in the form of general propositions which 'include in a descending scale of probability, generalizations accepted by the scientific community as established, the opinions of experts and 'common sense' generalizations based on the experience of members of society'. The appropriate method for establishing these generalizations is, in principle, inductive. The application of induction makes it possible to assign a probable truth value to a present proposition about past events. It also provides a test of validity for inferences from evidence since in this view: 'the characteristic mode of reasoning appropriate to forming and justifying judgments of probability about alleged past facts is induction'.

While referring to Bentham, Twining stated that there are direct and collateral ends of adjective laws: the direct end is rectitude of decision; the collateral end is minimizing the pains, vexation and expense of delay'. However, while the direct end forms an important social value it may give way to the above collateral value or other values which may be equally important.[10]

It is not of direct relevance to my thesis to embark on an

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10. *Ibid*. p 247.

investigation of the historical accuracy of Twining's thesis nor the acceptability of these assumptions. Twining's thesis is mainly a study of Anglo-American evidence scholarship from within. It does not go deep into the intellectual sources of that tradition beyond what can be gathered from leading Anglo-American legal writers on evidence. Furthermore Twining's thesis has not attempted to identify the atomistic nature of that tradition or link it in detail with the philosophy which provided its intellectual framework.

The present thesis provides a direct linkage between the tradition and its philosophical sources. It also attempts to trace the atomistic analysis of evidence to its intellectual sources in the empiricist philosophy of the English School. This is done by the study of selected scholars in both disciplines. The evidence scholars are Gilbert, Bentham, Stephen and Wigmore. The study within English empiricist philosopohy is confined mainly to a study of the relevant parts of Bacon, Locke, Bentham and John Stuart Mill.

The result of the investigation, the grounds of which cannot be gone into fully in this introduction, is that the atomistic approach is a natural product of the application of cognitivist empiricist philosophy and its methodologies. The investigation has also revealed that atomism is not limited to the traditional evidence scholars. It is reflected in the analysis of most participants in the current probability debates. Recent attempts to present judicial proof as a function of either mathematical or inductive probabilities, as I shall argue, are two extremes of one and the same philosophical tradition i.e. the empiricist school. It is for this reason that both the Baconians and the Pascalians

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have failed to provide satisfactory solutions for the problems of judicial proof. His finding makes it necessary to carry the investigation outside that dominant tradition or at least its mainstream.

D.   The Holistic Aplproach

(1)   Emerging Holists. Participants in the probability debates have thrown much light on the complexity of the judicial fact finding process. Some have also expressed their dissatisfaction with specific features of atomism. The recognition of an eliminative process and the rejection of atomicity of analysis are some examples of this dissatisfaction. It is important to note here that the objection to atomicity in this emerging thought is not one to an item-by-item analysis. It is an objection to that type of analysis when it is conducted in complete isolation from the other evidence in a case. These deviant atomists and others, who express, in one form or another any dissatisfaction with one or more features of atomism, I call emerging holists.

(2)   Glassford. A link can be discerned between this emerging thought and that expressed by a relatively isolated and largely neglected figure, James Glassford in his Essay in 1820.[11] The link consists mainly in a common critical attitude towards atomistic analysis. But there is this great difference between the two: emerging holism does not question the philosophical sources of the analysis or the appropriateness of the method it employs; Glassford on the other hand rejects both the analysis and its empiricist methodologies. He assigns a very limited role to generalised experience beyond his recognition of its role in determining what

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11. An Essay on the Principles of Evidence and Their Application to Subjects of Judicial Enquiry.

is relevant for the consideration of the fact-finder. He also expressly rejects the mathematical analysis and probably had little faith in the usefulness of Baconian methods in moral inquiries. Glassford's intellectual source is mainly the Scottish Common Sense school and that of Thomas Reid and Dugald Stewart in particular. That philosophy rejects the cognitivism of what it called the 'ideal theory' of which the philosophy of John Locke and English empiricism is viewed as an integral part. The significance of the discovery of Glassford and the investigation of his philosophical background in a different philosophical tradition from that of the atomist is that the rejection of atomistic analysis presupposes the rejection of its philosophical sources.

The Scottish Common Sense school stressed the need for a methodology of knowledge. Both Reid and Stewart accepted and applied Bacon's methods to moral inquiries. Glassford, while agreeing with Reid and Stewart in rejecting the application of mathematical analysis to moral inquiry, does not seem to share their enthusiasm about Baconian methods. However, his book contains the germ of a method, which I call the holistic method. The holistic approach its thesis and analysis will be explicated and developed in this thesis. Some features of holism have already emerged in the course of criticising the atomistic approach. Holism advocates a conception of fact finding which contrasts squarely with the atomistic approach. Holism relegates the role of generalized experience and logic either to the stage preceding the commencement of the discovery process (relevance) or to a post-discovery stage (logical analysis); it assigns a major role to facts in the discovery process. It attempts to relate the

analysis of evidence to the complexity of the task presented by various problems which the total mass of relevant evidence in different types of case pose for the fact-finder. The description of occurrences, events, objects, their identities qualities and relations within specific spatio-temporal regions by contending parties provide the fact-finder with the proper context for the investigation of the probability of evidentiary facts. The probability of an evidentiary fact is primarily a function of its consistent spatio-temporal region (ESTR). It may be true that in exceptional cases where the same evidentiary fact is alleged by both parties to exist within two independent spatio-temporal regions the determination of what existed or did not exist within one region operates to exclude or confirm the opposing allegation within the other inconsistent region. The determination of the probative force of an evidentiary fact, on the other hand, demands the establishment of an empirical link between the evidentiary fact spatio-temporal region and that of the fact in issue to which the evidentiary fact relates (PSTR). When all facts in issue are alleged to have existed within one PSTR, then any link between a fact in issue within that region and an evidentiary fact operates also as a link with the other facts in issue. When, on the other hand, the facts in issue are alleged to have existed within distinct spatio-temporal regions any evidence relevant to such region should not be treated as relevant to another independent spatio-temporal region. The relation of the facts in issue to the substantive legal rule i.e. as the necessary initial condition for its application, should not be treated as a warrant, in every case, of the transitivity of all relevant evidence indiscriminately to every fact in issue or to the legal conclusion reachable through their conjunction with the substantive legal rule.

The holistic analysis treats the fact-finding process as comparable to a discovery process in natural sciences as opposed to a post-discovery process. It concentrates on the problems of the process of fact-finding rather than the post-discovery analysis and testing of validated reports. For this reason it attempts to relate such concepts as relevance of a fact, its probability, and the probative force of the whole accepted evidence within a particular spatio-temporal region to the analysis of that process.

E.   Conclusions.

The main aims and conclusions of this thesis can be briefly summarized as follows:-

(a)   It seeks to test Twining's thesis about the homogeneity of the rationalist tradition. While most of his conclusions are confirmed, it is suggested that he does not give adequate weight to the alternative approach of James Glassford and the Scottish Common Sense school of philosophy (see (d) below). This thesis also seeks to extend Twining's account by analysing the links between specialized writings on judicial evidence and their philosophical sources.

(b)   It identifies and analyses the characteristically atomistic approach of the writings in the rationalist tradition and links that approach with its philosophical sources and provides a critique of both the approach and its philosophical foundations.

(c)   It establishes the resurgence of interest of the current probability debates in atomistic analysis. However, it identifies some deviant atomists and others and points out the significance and limitations of their analysis.

(d)   The research discovers a different evidence tradition grounded

in a different philosophical thought, i.e. Glassford and the ascertainment of his philosophical sources as the Scottish Common Sense philosophy. The distinct stance of Glassford vis-a-vis the other members of the Scottish Common Sense school has been established and viewed in this research as an indication of a search for a holistic method.

(e)   Finally the holistic germs in Glassford's essay and emerging holism are developed into a positive theory of a holistic method for the analysis of judicial evidence.

PART I

THE INTELLECTUAL HISTORY OF THE ANALYSIS OF
EVIDENCE CONCEIVED OF AS FACTS OR REPORTS
ABOUT FACTS[1]

Introduction

Part I of this work attempts an investigation of the intellectual

sources of the atomistic analysis of evidence conceived of as facts in

adjudication in Anglo-American evidence scholarship.   The study is

confined to some scholars, within that tradition, who consider the

analysis of evidence in that respect.   The evidence scholars to be

considered here are Sir Jeffery Gilbert, Jeremy Bentham, Sir James

Fitzjames Stephen and John Henry Wigmore.[2]   The purpose of this

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1.   This is a useful contexual distinction.   A similar distinction was
introduced by Thayer in the following passage: 'It must be noticed, then,
that "evidence", in the sense used when we speak of the law of evidence,
has not the large meaning imported to it in ordinary discourse.   It is
a term of forensic procedure;   and imports something put forward in a
court of justice.'.   See, A Preliminary Treatise On Evidence at the
Common Law, (1898), '. 264.   The ultimate object of Thayer in making the
distinction was to narrow down the field of the law of evidence and its
study as a system of rules to what pertains to judicial evidence in that
conception of it: See ibid. p.1., and p. 485.   While I do not agree
that the study of evidence should be so narrowly conceived, the distinction
is apt for my purpose since it limits my endeavour to a definite type of
inquiry in relation to a definite body of information (the facts put
forward in a court of justice).   This thesis is confined to the analysis
of that type of evidence in that type of context.   It excludes the
analysis of 'evidence' or information received by an investigator or a
party at the   preliminary or preparatory stages of a legal trial (e.g.
the type of analysis presented by W. Twining and T. Anderson in their
Analysis of Evidence, (forthcoming)) because according to my thesis the
context in which the analysis is performed plays a distinctive role in the
identification of the evidence to be analysed and the manner in which it
should be analysed.   See also Peter Achinstein, (ed.), The Concept of
Evidence (1983).

2.   This study does not include Thayer who is regarded by most lawyers
as one of the great evidence scholars.   To explain his omission we have
to remember that Thayer's conception of the field of evidence was
limited to what may be called 'a pure system of legal rules of evidence'.
He regarded certain topics, including the present topic of this thesis,
as collateral matters which are improperly treated as belonging to the law
of evidence.   He attempted to discriminate this from the law of evidence
so as to relieve it of a great part of its difficulties and ambiguities,
and declared that any study of this should be regarded as incidental and
auxiliary in the course of examination of the law of evidence.   See Thayer,
op.cit. pp. 1 and 273, see also ibid. prefatory note.

part of the thesis is twofold: to trace the atomistic approach of the rationalist philosophers to its immediate philosophical sources in empiricist thought; to argue further that the conceptual framework of both rationalists and empiricists provide inadequate conceptual tools for the analysis of evidence and the determination of what constitutes a rational decision on the evidence in adjudication.[3]

I hope by considering Gilbert's theory of evidence,[4] and its derivation from the philosophy of John Locke, to show the original and immediate impact of the atomistic features of that philosophy on the first theory of evidence. The versions of that model, however modified, assumed by other evidence scholars in the light of empiricist philosophy in general, and that of Francis Bacon and John Stuart Mill in particular, will be considered when we deal with the theories of Bentham, Stephen, Wigmore and the probability debates.

CHAPTER ONE

GILBERT'S THEORY OF EVIDENCE: ITS LOGICAL AND
EPISTEMOLOGICAL FOUNDATIONS.

A. Gilbert and Locke

1. Gilbert's adaptation of Lockean theory of Knowledge.

Gilbert was Lord Chief Baron of the Court of Exchequer from 1722 until his death in 1726. He was the author of the Law of Evidence,[5] which was the first book on evidence in English and was published in 1754. His philosophical source is explicitly the philosophy of John Locke. His knowledge of that philosophy is testified to by his

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3. See below chs. 7, 8, 9 and 10.

4. Gilbert, The Law of Evidence, (1754).

5. See Gilbert, Law of Evidence, Capel Lofft (ed.) 'Some account of the Lord Chief Baron Gilbert ' (1791) p.i; See also Twining 'The Rationaliat Tradition' op.cit. p 215 et seq; See also Simpson, Biographical Dictionary of the Common Law; (1984).

Abridgement of Mr. Locke's Essay on Human Understanding[6] and his consistent
and coherent adaptation of that philosophy to his theory of evidence. The
object of Gilbert was to establish that assent in a judicial determination
is, in effect, a demonstrative assent. He adapted some parts of Locke's
theory of knowledge for that purpose. His best evidence principle, as
we shall see, is an important part of that adaptation. Like Locke,
Gilbert did not try to analyse the notion of evidence, or the inferential
processes whereby the mind reaches its final assent. His was a descriptive,
psychologistic theory of that assent, and the conditions for rendering the
exercise of it demonstrative. The best evidence requirement is an
essential condition to bring about that result. Gilbert expressed his
view of the nature of judicial determination in the following passage:

> The first therefore, and most final Rule, in Relation to
> Evidence, is this, That a Man must have the utmost Evidence,
> the Nature of the Fact is capable of; For the Design of the
> Law is to come to rigid Demonstration in Matters of right,
> and there can be no Demonstration of a Fact without the best
> Evidence that the Nature of the Thing is capable of; less
> Evidence doth create but Opinion and Surmise, and does not
> leave a Man the entire Satisfaction, that arises from
> Demonstration, for if it be plainly seen in the Nature of
> the Transaction, that there is some more Evidence that doth
> not appear, the very not producing it is a Presumption, that
> it would have detected something more than appears already,
> and therefore the Mind does not acquiesce in any thing lower
> than the utmost Evidence the Fact is capable of. [7]

It is important to state here that though Gilbert recognised that the
grounds on which the final assent is reached are only probable grounds,
he was anxious to establish that the final assent has the effect of a
demonstration.[8] A strict Lockean demonstration can never be based
on probable grounds. It requires simple and distinct ideas which are
perceived to be necessarily connected.[9] Gilbert knew that judicial

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6. See Gilbert, Law of Evidence (Capel Lofft (ed.) 1791) p.3 et seq.

7. Law of Evidence, pp 3-4.

8. Ibid. p 2.

9. John Locke, An Essay Concerning Human Understanding (1691) p 434
et seq. See also pp 59-320, 424 et seq, 546, 567-8. (This source shall
hereafter be cited as 'Locke's Essay').

evidence falls short of this degree of certainty when he stated that:

> All Certainty is a clear and distinct Perception, and all
> clear and distinct Perceptions depend upon a man's own
> proper Senses, for this in the first Place is certain, and
> that which we cannot doubt of if we would, that one
> Perception or Idea is not another, that one Man is not another... [10]

Such certainty and rigid demonstration is foreign to the nature of reports

about evidence as Gilbert himself states:

> Now most of the Business of civil Life subsists on the Actions
> of Men that are transient Things, and therefore often-times
> are not capable of strict Demonstration, which, as I said, is
> founded on the View of our Senses and therefore the Rights
> of Men must be determin'd by Probability. [11]

These reports of probabilities have to be contrasted with a man's own

perceptions.   Judges and juries who receive reports from witnesses

are not themselves witnesses and consequently do not themselves have

perceptual, or strictly demonstrative, knowledge of the situation.   The

question arises as to whether there is any way according to which such

reports could have the effect of demonstration.   Locke states that

certain probabilities do have such an effect;[12] and most probably

Gilbert was referring to this when he said:

> Now this in the first Place, is very plain, that when we can't
> see or hear any thing ourselves, and yet are obliged to make
> a Judgment of it, we must see and hear by Report from others;
> which is one Step farther from Demonstration, which is founded
> upon the View of our own Senses, and yet there is that Faith
> and Credit to be given to the Honesty and Integrity of credible
> and disinterested Witnesses, attesting any Fact under the
> Solemnities and Obligation of Religion, and the Dangers and
> Penalties of Perjury, that the Mind equally acquiesces therein
> as on a Knowledge by Demonstration, for it cannot have any more
> Reason to be doubted than if we ourselves had heard and seen it;
> and this is the Original of Tryals, and all manner of Evidence. [13]

As a matter of fact Locke models his theory of probability on his theory

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10.   See Law of Evidence, p 2.

11.   Ibid, p 3.

12.   Locke's Essay, pp 561-563.

13.   Law of Evidence, p 3.

of knowledge.[14]   A judgment of probability for example is established

in the same way the conclusion of a demonstration is established.

> As demonstration is the showing the agreement or disagreement
> of two ideas by the intervention of one or more proofs, which
> have a constant, immutable and visible connexion one with
> another; so probability is nothing but the appearance of such
> an agreement or disagreement by the intervention of proofs,
> whose connexion is not constant and immutable, or at least
> is not perceived to be so; but is, or appears for the most
> part to be so, and is enough to induce the mind to judge the
> proposition to be true or false, rather than the contrary.[15]

For Locke a probability which is established in this way can be

detached from its proofs and stated as an objective probability.[16]

Thus, he writes:

> The grounds of probability we have laid down in the foregoing
> chapter, as they are the foundations on which our assent is
> built, so are they also the measure whereby its several
> degrees are or ought to be regulated;   only we are to take
> notice, that whatever grounds of probability there may be,
> they yet operate no further on the mind, which searches after
> truth and endeavours to judge right, than they appear at least
> in the first judgment or search that the mind makes.   I
> confess, in the opinions men have and firmly stick to in the
> world, their assent is not always from an actual view of the
> reasons that at first prevailed with them; it being in many
> cases almost impossible, and in most very hard, even for those
> who have very admirable memories, to retain all the proofs
> which upon a due examination made them embrace that side of
> the question.   It suffices that they have once with care and
> fairness sifted the matter as far as they could; and that
> they have searched into all the particulars that they could
> imagine to give any light to the question, and with the best
> of their skill cast up the account upon the whole evidence
> and thus, having once found on which side the probability

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14.   The modelling of the theory of Probability on that of knowledge
(i.e. Demonstration) resulted in the following assumptions on the part
of the rationalist evidence scholars: that probable judgments on
evidence must be reached inferentially;   such inferences must be chosen
from general laws of probability comparable to established and accepted
scientific laws; a judicial proof should be concerned with the
formulations of those general laws of inference as derived from general
experience (Commonsense generalizations), and with inquiring into the
methods whereby such laws could be established;   the obviously mistaken
assumption by some of the evidence scholars that a particular inference
rather than the generalization from which it was inferred is inductively obtained
As to this see, for example, Wigmore, The Science of Judicial Proof, (1937),
pp 18 et seq.

15.   Locke's Essay, p 555.

16.   Compare L. Jonathan Cohen, The Probable and the Provable, (1977),
p 134.

appeared to them after as full and exact an inquiry as they
can make, they lay up the conclusion in their memories as
a truth they have discovered; and for the future they remain
satisfied with the testimony of their memories, that this is
the opinion that, by the proofs they have once seen of it,
deserves such a degree of their assent as they afford it.[17]

It is clear from this and other passages that Locke treated probability in

the same manner as he treated demonstration at least as far as the

reasoning process is concerned. The mind moves from one idea to another

in the search for a connection to provide the link between the different

ideas.[18]   That process in the case of demonstration produces a

proposition whose proofs or intermediate ideas can be shown to any-

body because of their necessary connection, and the replicability of

the situation to which they apply.[19]   In the case of probability

only the conviction can be retained, the proofs cannot.[20]   Accordingly

judgments of probability can be the conclusions of arguments.   In

most cases its grounds and conclusions are not as reliable as those

of demonstration, but Locke considered certain probabilities to have

a high degree of assurance or certainty similar to that produced by

demonstration.

He mentioned two situations and gave three examples to illustrate

them.   In the first situation the probable grounds according to Locke

'rise so near to certainty that they govern our thoughts as absolutely,

and influence all our actions as fully, as the most evident demonstration;

and, in what concerns us, we make little or no difference between them

and certain knowledge.   Our belief thus grounded rises to assurance.'[21]

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17. Locke's Essay, pp 558-9

18. Ibid, pp 567-8, 530-1 and 434.

19. Ibid, p 427.

20. Ibid, p 556.

21. Ibid, p 562.

The example given by Locke illustrative of this situation is when:

> [T]he general consent of all men in all ages, as far as it
> can be known, concurs with a man's constant and never
> failing experience in like cases, to confirm the truth
> of any particular matter of fact attested by fair witnesses;
> such are all the stated constitutions and properties of
> bodies, and the regular proceedings of causes and effects
> in the ordinary course of nature.[22]

The second degree of assent, which is similar to that of demonstrative assurance, arises in a second type of situation. In that situation, the probable grounds induce confidence rather than assurance. The examples given by Locke to illustrate that situation are twofold:

> [W]hen I find by my own experience, and the agreement of
> all others that mention it, a thing to be for the most
> part so; and that the particular instance of it is
> attested by many and undoubted witnesses; v.g., history
> giving us such an account of men in all ages, and my own
> experience, as far as I had an opportunity to observe,
> confirming it, that most men prefer their private
> advantage to the public....[23]

The second illustration is of situations in which there are reliable reports about matters of fact that happen indifferently. Because, 'when any particular matter-of-fact is vouched by the concurrent testimony of unsuspected witnesses, there our assent is also unavoidable.'.[24] As to the impact of such grounds on the mind and its reliability in guiding its actions Locke has this to say:'Probability upon such grounds carries so much evidence with it, that it naturally determines the judgment, and leaves us as little liberty to believe or disbelieve as a demonstration does whether we will know or be ignorant.'.[25]

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22. _Ibid_, p 561.

23. Locke's _Essay_, p 562.

24. _Id_.

25. _Ibid_, pp 562-3.

It is true that Locke referred to other grounds of
probability, which afford less confident degrees of assents, and
he described the scale of such probabilities. For Gilbert what
determines a probability along that scale is the required degree
of assent. As we have already mentioned, he saw the aim of the
law to be the attainment of a demonstrative assent on probable
grounds;[26] and for him Lockean demonstration is the highest degree
of Lockean probability. It is interesting in this respect to
compare the following two passages by Gilbert and Locke respectively.
Gilbert, referring to Locke, stated that:

> In the first Place, it has been observed by a very learned
> Man, that there are several Degrees from perfect Certainty
> and Demonstration, quite down to Improbability and Unlike-
> liness, even to the Confines of Impossibility; and there
> are several Acts of the Mind proportion'd to these Degrees
> of Evidence, which may be called the Degrees of Assent,
> from full Assurance and Confidence, quite down to Conjecture,
> Doubt, Distrust and Disbelief.'.[27]

The passage from Locke is:

> But, there being degrees herein, from the very neighbour-
> hood of certainty and demonstration, quite down to
> improbability and unlikeliness, even to the confines of
> impossibility; and also degrees of assent from full
> assurance and confidence, quite down to conjecture, doubt,
> and distrust... [28]

It is to be noticed that the neighbourhood of certainty of Locke
becomes the perfect certainty of Gilbert. It may be argued that
Gilbert inserted 'perfect certainty' to correspond to full
assurance and confidence in the corresponding scale of assent.
The real reason seems to be an adherence to Lockean logic in the
lines immediately preceding his above-mentioned quotation where
he stated:

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26. Law of Evidence, p 3.

27. Ibid, p 1.

28. Locke's Essay, p 556.

> Our knowledge, as has been shown, being very narrow,
> and we not happy enough to find certain truth in every
> thing which we have occasion to consider, most of the
> propositions we think, reason, discourse, nay, act upon,
> are such as we cannot have undoubted knowledge of their
> truth; yet some of them border so near upon certainty,
> that we make no doubt at all about them, but assent to
> them as firmly, and act according to that assent as
> resolutely, as if they were infallibly demonstrated,
> and that our knowledge of them was <u>perfect and certain</u>.

(Emphasis added.)[29]

So the scale of probability includes a degree of perfect certainty,

and the corresponding degree of assent is demonstrative.   As we

have seen Gilbert regarded the attainment of that to be the aim

of the law.   According to this analysis Gilbert was concerned with

the impact of the proofs when the judges of legal rights 'assent

to them as firmly, and act according to that assent as resolutely

as if they were undoubtedly demonstrated,'[30]

As we have seen, Gilbert was aware of the fact that reports

from witnesses removed the tribunal at least one step further away

from demonstration.   To remedy this defect he argued that the

fact that witnesses were on oath and disinterested enables the judge

and jury to treat their perceptions as their own.   The existence of

the oath also forces the fact finder to accept such reports as true.

'[E]very plain and honest Man affirming the Truth of any matter under

the Sanction and Solemnities of an Oath, is intitled to Faith and

Credit, so that under such Attestation the Fact is understood to be

fully proved.'.[31]   These facts are the "ideas" from which the final

probability is reached, and direct perception is not necessary for

acceptance of them.

But some grounds or ideas afford, in Gilbert's view, a better

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29. <u>Id</u>.

30. <u>Id</u>.

31. <u>Law of Evidence</u>, pp 100-1

opportunity for comparison because they retain the form of the evidence of the original idea or perception of the witness. Gilbert emphasized the nature of the matter reported by the witness and its liability to retain its original form when reported for the purpose of comparison:

> [P]ermanent Things, which being constantly obvious to our Senses, do afford to them a very clear and distinct Comparison; but transient Things that cannot always occur to our Senses are generally more obscure, because they have no constant Being, but must be retrieved by Memory and Recollection.[32]

Of course what he refers to is not the perception itself but the thing that is the cause of the perception. He stated this when he wrote:

> As if the Question be, whether certain Land be the Land of J. S. or J. N. and a Record be produced whereby the Land appears to be transferred from J. S. to J. N. now when we Shew any such third Perception, that doth necessarily infer the Relation in Question, this is call'd Knowledge by Demonstration, The way of Knowledge by necessary Inference is certainly the highest and clearest Knowledge that Mankind is capable of in his way of Reasoning, and therefore always to be sought when it may be had.[33]

When there is no oath to guarantee that result Gilbert resorted to a fiction of knowledge of the law even in the case of public records, which he regarded to be the paradigms of evidence. He stated this:

> On General Acts of Parliament, the printed Statute Book is Evidence; not that the printed Statutes are the perfect and authentick Copies of the Records themselves, for there is no absolute assurance of their Exactness, but ev'ry Person is supposed to apprehend and know the Law which he is bound to observe, and therefore the printed Statutes are allowed to be Evidence, because they are the Hints to that which are supposed to be lodged in every Man's Mind already.[34]

The important point however, is that either because of the oath,

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32. Ibid. pp 2-3.

33. Ibid. p 2.

34. Ibid. p 8.

or the fiction of knowledge of the law, the report of a witness or the contents of a document, public, or private, were considered to be as reliable as perceptions of the fact-finder of their origin.[35] That assumption is further fortified by the requirement of adducing the best evidence which we shall now proceed to consider.

2. The best Evidence Requirements.

We have already seen that the best evidence was mentioned by Gilbert in connection with and as a requirement of demonstration. This view is confirmed by what Locke said before Gilbert about the best evidence:

> This is what concerns assent in matters wherein testimony is made use of; concerning which, I think it may not be amiss to take notice of a rule observed in the law of England, which is, 'that though the attested copy of a record be good proof, yet the copy of a copy, never so well attested, and by never so credible witnesses, will not be admitted as a proof in judicature.' This is so generally approved as reasonable, and suited to the wisdom and caution to be used in our inquiry after material truths, that I never yet heard of any one that blamed it.[36]

Locke's approval and commendation of the best evidence is based on the following rationale:

> This practice, if it be allowable in the decisions of right and wrong, carries this obvervation along with it, viz., 'that any testimony, the farther off it is from the original truth, the less force and proof it has.' The being and existence of the thing itself, is what I call 'the original truth.' A credible man vouching his knowledge of it, is a good proof: but if another equally credible do witness it from his report, the testimony is weaker; and a third that attests the hearsay of an hearsay, is yet less considerable.[37]

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35. Jeremy Bentham, The Rationale of Judicial Evidence, Bowring (ed.), Works of Jeremy Bentham (1838-1843), Vol 6, p 143 et seq. and p 183 et seq. This edition of Bentham's Works shall hereafter be cited as "Works" preceded by the number of the volume.

36. Locke's Essay, p 563.

37. Id.

For this reason written evidence was seen by Gilbert as
the best evidence in preference to unwritten evidence because
it provides a view of the original matter and constantly preserved
a record of it that it is ever permanent and obvious to the view.[38]
The justification of authenticity is a fiction in the case of Courts'
transactions,[39] and a legal presumption in the case of general
Acts.[40]   And for the same reason private Acts were required to be
proved by the testimony of witnesses.[41]   Meanwhile, we shall move
on to consider another guarantee of demonstrative assent, viz., the
absence of an interest on the part of witnesses.

3. The Absence of Interest on the Part of Witnesses.

We have already seen that the oath and the best evidence
requirement were treated as two of the basic guarantees of
demonstration.[42]   The absence of interestedness on the part of
the source of evidence is, in Gilbert's view, another guarantee
of its reliability.   According to Locke and Gilbert there is a
rule of probability that an interested person prefers his own
interest to that of the public.   We have already quoted Locke in
that regard.[43]   Gilbert on the other hand mentioned this rule of
probability as a justification for the exclusion of unreliable
and interested witnesses at different places in his book.   The
following reference is a case in point:

> Now where a Man who is interested in the Matter in
> Question, would also prove it, 'tis rather a Ground
> for Distrust than any just Cause of Belief; for Men

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38.   Gilbert, Law of Evidence, p 6.

39.   Id.

40.   Ibid. p 8.

41.   Ibid. pp 9-10.

42.   See above, p.27.

43.   See above, n.23.

are generally so short-sighted;   as to look at their
own private Benefit which is near to them, rather
than to the Good of the World that is more remote,[44]

B. The limitation of Lockean philosophy in relation
to Gilbert's theory.

As we shall see Bentham questioned Gilbert's theory, and
regarded it as both too narrow and false.[45] It is undoubtedly
narrow since it left out most of what could be treated in a theory
of judicial evidence, a criticism that will be elaborated in a
later section.[46] It is important here, however, to try to trace
the narrowness of Gilbert's theory to the intellectual source of
that theory (ie. the philosophy of John Locke). I have argued so
far that Gilbert's main interest was to establish that judicial
assent on probable grounds was demonstrative in its effect. He
conceived of demonstration, in psychological terms, as something
that occurred in the final stage of the deliberations of the fact-
finder. Though he stated the conditions and precautions which
render that state of mind a demonstrative one he did not deal with
many matters relating to it. For example, he did not discuss the
concept of evidence itself; the grounds on which assent is or
ought to be reached; and whether or not all the offered grounds
(evidence) constitute proofs, and, if not, what aids the fact-finder
in sifting out proofs from non-proofs. In short he did not analyse
the evidence or assert the inferences drawn from it in reaching one's
conclusion. This is not meant to be a serious criticism of
Gilbert because, in all fairness to him, most of these issues failed
for one reason or another till very recently, to occupy in any

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44. Law of Evidence, p 87.

45. See Bentham, 6 Works, pp 143 et seq and pp 183 et seq.

46, See below p. 30 et seq.

useful way the attention of evidence scholars in the Anglo-American tradition.[47] To use the words of Sir Richard Eggleston '[w]hether we agree with him or not, we owe a debt of gratitude to Mr. L. Jonathan Cohen for forcing us to think about the mental processes involved in fact finding in the courts.'[48] In what follows I shall venture a few general remarks on the responsibility of Locke's philosophy for Gilbert's narrow concept of his theory of evidence. Such influence is not confined to Gilbert. The empirical philosophy of Locke, Francis Bacon and John Stuart Mill constrained in general the theorising exercises of other outstanding evidence scholars in the rationalist tradition. Thayer alluded to this matter in criticising Gilbert, but did not articulate his criticism in that direction.[49] It is necessary, I think, to try to mention some of the main characteristics of that philosophy which are likely to be the causes of Gilbert's narrow conception of what constitutes a theory of evidence.

One of the main reasons seems to me due to the atomistic nature of that philosophy and its concern with achieved cognition, and mental states and concepts which describe a result, rather than the way in which that result is or should be reached. To create a clear understanding of this it is necessary to try to locate Gilbert's theory of evidence both on the intellectual map of the rationalist tradition and in relation to current thinking about evidence and

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47. See below

48. R. Eggleston,"The Probability Debate", [1980] Crim.L.R. 678.

49. Thayer stated that 'Upon the whole, then, it may be said that the Best Evidence rule was originally, in days when the law of evidence had not yet taken definite shape, a common and useful phrase in the mouths of judges who were expressing a general maxim of justice, without thinking of formulating an exact rule; and that Gilbert, in his premature, ambitious, and inadequate attempt to adjust to the philosophy of John Locke the rude beginnings and tentative, unconcious efforts of the courts, in the direction of a body of rules of evidence, hurt rather than helped matters.' op.cit. p 506.

proof in that tradition.   As we shall see, the main concern of evidence scholars in that tradition was the devising of exclusionary rules for certain items or sources of evidence from being admitted for the consideration of the fact-finder.   The exposition, qualification, rationalization and criticism of those rules, and their application in particular cases, constitute the great bulk of the rationalist writings about evidence.   The main concerns of Gilbert, Bentham, Thayer, Stephen, Best, Wigmore and Cross were in that area.   Their interest and concern, (Wigmore and Stephen apart, and Bentham to some extent also), with the logical and epistemological problems raised by the admitted evidence, either as single items or as an aggregate mass in the mind of the fact-finder and evidence theorist, were very limited and sketchy, as we shall see.   It is true that Stephen and Wigmore concerned themselves with the inferential nature of judicial fact finding. Wigmore, for instance, analysed, and emphasized the importance of, the inferential processing of the evidence at the level of the simple elements (ie. atoms).   However, other attempts to do this offered little or no improvement on Wigmore's until Jonathan Cohen wrote his book The Probable and the Provable in 1977.   That book, which we shall treat in a separate section, has thrown great light on most of the main problems of judicial fact finding and the fact finding process in general.   It has provoked various and differing reactions,[50] the most extensive of which is that of Professor David Schum in his various writings on cascaded

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50. See below. ch. 6.

inferences.[51]   The attempts of Wigmore, Cohen, Schum and other

participants in the current probability debates can be seen as

attempts to provide ultimate prescriptive norms for the

performance of the fact finding task, by pointing out its

ingredients, and the methods and criteria by which those ingredients

can be assessed and combined by the fact-finder in order to reach

the final probability judgment.   Gilbert's main concern was to

represent this final judgment as a demonstrative one.   To do this

he insisted on very strict rules of admissibility, which were both

necessary to secure that result, and responsible for his very

stringent exclusionary theory, which, in turn, was criticised by

Bentham and Thayer.[52]   His concern with the problems of judicial

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51. See Schum and Du Charme, 'Comments on the Relationship between the Impact and Reliability of Evidence', (1971) 6 Organizational Behavior and Human Performance, p 111, (herafter cited as Or.B.H.P.); Schum and Kelly, 'A Problem in Cascaded Inference: Determining the Inferential Impact of Confirming and Conflicting Reports from Several Unreliable Sources,'(1973), 10 Or.B.H.P., p 404; Schum 'Contrast Effects In Inference: On the Conditioning of Current Evidence by Prior Evidence', (1977) 18 Or.B.H.P., p 217; Schum 'A Review of a Case Against Blaise Pascal and his Heirs' (1979), 77 Mich. L. Rev. p 446; Schum 'Current Developments in Research on Cascaded Inference Processes', in T. Wellsten (ed.), Cognitive processes in Decision and Choice Behavior   (1979); Schum, 'On the Behavioral Richness of Cascaded Inference Models: Examples in Jurisprudence', in N. Castellan (ed.), Cognitive Theory, p 149; Schum 'On Factors Which Influence the Redundancy and Corroborative Evidence', Dept. of Psychology, Rice University, Report No. 79-02, (hereafter cited as Rice's Report); Schum 'A Bayesian Account of Transitivity and other Order-Related Effects in Chains of Inferential Reasoning', Rice's Report No. 79-04; Schum and A. W. Martin, 'Empirical Studies of Cascaded Inference In Jurisprudence: Methodological Considerations', Rice's Report No. 80-01; Schum and A. W. Martin, 'Probabilistic Opinion Revision on the Basis of Evidence at Trial: A Baconian or a Pascalian process?', Rice's Report No. 80-02; Schum and A. W. Martin 'Assessing the Probative Value of Evidence In Various Inference Structures', Rice's Report No. 81-02; Schum 'Formalizing The Process of Assessing The Probative Value of Alibi Testimony', Rice's Report No. 81-05.

52. See above. n. 46.

proof was confined to showing that final assent when it was reached has a demonstrative effect. In the following section I shall try to show the contribution of the philosophy of Locke to the narrowness of Gilbert's conception of judicial proof.

C. The constraints of Lockean Theory of Knowledge

1. Probability and demonstration.

The most important constraint on Gilbert's theorizing activity arises from his adoption of Lockean theory of knowledge, and the fact that Locke's theory of probability which he drew on was not developed independently of his theory of demonstration. Locke's theory of probability was just an appendix to his theory of demonstration; it not only has the same basis as his theory of demonstration, but cannot easily be comprehended or discussed except by comprehending his theory of ideas and their modes of combination to form general propositions. It is not an accident that Gilbert had to first discuss demonstration in order to get to probability. For him 'to come to the true Knowledge of the Nature of Probability, it is necessary to look a little higher, and see what Certainty is, and whence it arises.'.[53] Equating the problems of probability, in many important respects, with those of demonstration is, as we shall see, one of the main reasons for the failure of Gilbert and other evidence scholars to see the nature of many important problems arising from the judicial fact finding task. The main aspects of his theory of knowledge which produce an adverse effect on his treatment of probability can be briefly stated in the following points.

2. The Mind

The mind, which was the repository of knowledge according to Locke's theory of knowledge, is an abstract mind which he conceived

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53. Law of Evidence, p 2.

of, when discussing probability, as being in a state of achieved cognition, i.e., as having both its simple and complex ideas firmly lodged inside it.[54] That mind can always apprehend within itself its clear and distinct ideas, without the necessity of using words or names to help its thinking, as usually happens in the case of complex ideas. Locke refers to this when he says:

> And that which makes it yet harder to treat of mental
> and verbal propositions separately, is, that most men,
> if not all, in their thinking and reasoning within them-
> selves, make use of words instead of ideas, at least
> when the subject of their meditation contains in it
> complex ideas. Which is a great evidence of the
> imperfection and uncertainty of our ideas of that kind,
> and may, if attentively made use of, serve for a mark
> to show us what are those things we have clear and
> perfect established ideas of, and what not. For, if we
> will curiously observe the way our mind takes in thinking
> and reasoning, we shall find, I suppose, that when we
> make any propositions within our own thoughts about white
> or black, sweet or bitter, a triangle or a circle, we can
> and often do frame in our minds the ideas themselves
> without reflecting on the names. But when we would
> consider or make propositions about the more complex
> ideas, as of a man, vitriol, fortitude, glory, we
> usually put the name for the idea: because, the ideas
> these names stand for being for the most part imperfect,
> confused, and undetermined, we reflect on the names
> themselves, because they are more clear, certain, and
> distinct, and readier occur to our thoughts, than the
> pure ideas: and so we make use of these words instead
> of the ideas themselves, even when we would meditate and
> reason within ourselves, and make tacit mental propositions.[55]

The ideas and perceptions of a mind were viewed in isolation and treated by Locke as the contents of a solitary mind. As a matter of fact, communication and language were afterthoughts in his philosophy:

> I must confess, then, that when I first began this
> discourse of the understanding, and a good while after,
> I had not the least thought that any consideration of
> words was at all necessary to it. But when, having
> passed over the original and composition of our ideas,
> I began to examine the extent and certainty of our

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54. Locke's Essay, pp. 108 et seq. ; See also P. Edwards, (ed.), The Encyclopedia of Philosophy, (1967, 1972)

55. Ibid. p 492.

> knowledge, I found it had so near a connexion with
> words, that unless their force and manner of signification
> were first well observed, there could be very little said
> clearly and pertinently concerning knowledge: which,
> being conversant about truth, had constantly to do with
> propositions. And though it terminated in things, yet
> it was for the most part so much by the intervention of
> words, that they seemed scarce separable from our
> general knowledge.[56]

In what follows we shall consider some of the main features of simple
ideas which are necessary, according to Locke's account, for the
formulation of general and certain propositions.

3. Simple Ideas

One of Locke's main concerns in discussing simple ideas
was to emphasize their origin in sensation and reflection, as opposed
to the then firmly held view that they were innate.[57] However, what
is relevant here for our argument is his views on the question
whether these ideas enter the mind as simple and particular ideas,
or as complexes; and what types of simple ideas constitute general
and certain knowledge.[58] For Locke ideas enter the mind and
remain there as simple ideas. He stated this when he wrote:

> Though the qualities that effect our senses are, in the
> things themselves, so united and blended that there is
> no separation, no distance between them; yet it is
> plain the ideas they produce in the mind enter by the
> senses simple and unmixed. For though the sight and touch
> often take in from the same object at the same time
> different ideas - as a man sees at once motion and colour,
> the hand feels softness and warmth in the same piece of
> wax - yet the simple ideas thus united in the same
> subject are as perfectly distinct as those that come in by
> different senses; the coldness and hardness which a man
> feels in a piece of ice being as distinct ideas in the
> mind as the smell and whiteness of a lily, or as the taste
> of sugar and smell of a rose: and there is nothing can
> be plainer to a man than the clear and distinct perception
> he has of those simple ideas; which, being each in
> itself uncompounded, contains in it nothing but one
> uniform appearance or conception in the mind, and is not

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56. Ibid. p 395.

57. Ibid. bk.1. passim.

58. Id; see also Bentham, 8 Works p 26, Gerald Postema, 'Facts,
Fictions and Law: Bentham on the Foundations of Evidence', in
William Twining (ed.), Facts in Law (1983), p 37 and pp 49 et seq;
See also below ch. 9, p 216.

distinguishable into different ideas.[59]

These simple ideas correspond to simple qualities in the objects

outside the mind.

> Whatsoever the mind perceives in itself, or is the
> immediate object of perception, thought, or understanding,
> that I call 'ideas'; and the power to produce any idea
> in our mind, I call 'quality' of the subject wherein
> that power is. Thus a snowball having the power to
> produce in us the ideas of white, cold, and round, the
> powers to produce those in us as they are in the snowball,
> I call 'qualities'; and as they are sensations or
> perceptions in our understandings, I call them 'ideas';
> which ideas, if I speak of them sometimes as in the things
> themselves, I would be understood to mean those qualities
> in the objects which produce them in us.[60]

It is not necessary or important for our present purposes to go into

any discussion of what constitutes these qualities. Locke stated

that some perceptions enter the mind as obscure, indistinct, and

undetermined ideas,[61] but his view of which ideas are capable of

forming general and certain knowledge is shown from the following

passages:

> But if anyone will consider, he will (I guess) find that
> the great advancement and certainty of real knowledge,
> which men arrive to in these sciences was not owing to the
> influence of these principles, nor derived from any
> peculiar advantage they received from two or three general
> maxims laid down in the beginning; but from the clear,
> distinct, complete ideas their thoughts were employed
> about, and the relation of equality and excess so clear
> between some of them, that they had an intuitive knowledge,
> and by that a way to discover it in others, and this without
> the help of those maxims.[62]

Other ideas do not qualify to produce any clear or distinct

knowledge:

> But ideas which by reason of their obscurity or otherwise
> are confused, cannot produce any clear or distinct
> knowledge; because as far as any ideas are confused, so
> far the mind cannot perceive clearly whether they agree
> or disagree. Or, to express the same thing in a way

59. Locke's Essay, pp 70-1.

60. Ibid. p 85.

61. Ibid. pp 436, 492, 544.

62. Ibid. p 544.

less apt to be misunderstood, he that hath not determined the ideas to the words he uses cannot make propositions of them, of whose truth he can be certain.[63]

Another requirement is that the idea must be adequate; by that Locke meant that there should be a correspondence between the idea of the mind and the quality and object outside the mind. He regarded all simple ideas to be adequate:

> Because being nothing but the effects of certain powers in things, fitted and ordained by God to produce such sensations in us, they cannot but be correspondent and adequate to those powers: and we are sure they agree to the reality of things. For if sugar produce in us the ideas which we call 'whiteness', and 'sweetness', we are sure there is a power in sugar to produce those ideas in our minds, or else they could not have been produced by it.[64]

It is important to observe that the correspondence referred to throughout the philosophy of Locke is an archetypal correspondence. It does not mean more than that the idea which exists in the mind was once taken from a quality existing outside that mind. For this reason Locke treated ideas of substance as inadequate, because they have no archetypes in the mind.[65] Archetypal correspondence is a representative and a timeless correspondence, and is true of abstract ideas only.[66] In the words of Locke himself [w]e must therefore, if we will proceed as reason advises, adapt our methods of inquiry to the nature of the ideas we examine, and the truth we search after. General and certain truths are only founded in the habitudes and relations of abstract ideas.'[67] Very close to this requirement is that of consistency of truth. By this Locke meant that each idea agrees with itself and differs from all other ideas. The mind cannot fail to feel

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63. Ibid. p 439.

64. Ibid. p 299.

65. Ibid. p 483.

66. Ibid. p 546 and pp 486-7.

67. Ibid. p 546.

and see the distinctness and separateness of its own ideas.
'There can be nothing more certain, than that the idea we receive
from an external object is in our mind; this is intuitive knowledge.'[68]
When working on these ideas which have the qualities which we have
just mentioned the mind is capable of constructing general knowledge.
'Since the mind, in all its thoughts and reasons has no other
immediate object but its own ideas, which it alone does or can
contemplate, it is evident that our knowledge is only conversant
about them.'[69]   We shall now proceed to consider this aspect of
Lockean theory of knowledge.

    D. General Knowledge and the Methods of its Discovery
1. General Knowledge.

    The ingredients of Locke's theory of knowledge are simple,
distinct and perfect ideas.   The mind compares its own ideas
in order to see their connection, agreement, disagreement or
repugnancy.   The inquiry into general knowledge can thus be seen
to be an inquiry into the relationship between ideas which are
already existing in the mind.   It is not an inquiry into the
nature, existence, truth or quality of any of these ideas.   This
introspective examination of the mind's ideas produces either
intuitive or demonstrative knowledge.   We are here concerned mainly
with demonstrative knowledge.   We have already seen what
demonstrative knowledge means.   The search for the necessary
relations which are required for a demonstration according to Locke
calls for:

> A sagacious and methodical application of our thoughts,
> for the finding out these relations, is the only way
> to discover all that can be put, with truth and certainty,
> concerning them, into general propositions.   By what
> steps we are to proceed in these, is to be learned in the

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68. Ibid. p 438.

69. Locke's Essay, p 424.

schools of mathematicians, who, from very plain and easy
beginnings, by gentle degrees, and a continued chain of
reasonings, proceed to discovery and demonstration of
truths that appear at first sight beyond human capacity.
The art of finding proofs, and the admirable methods they
have invented for the singling out and laying in order
those intermediate ideas that demonstratively show the
equality or inequality of unapplicable quantities, is that
which has carried them so far, and produced such wonderful
and unexpected discoveries: but whether something like
this, in respect of other ideas, as well as those of
magnitude, may not in time be found out, I will not
determine.[70]

Though this passage may be interpreted as one in which Locke

is interested in the process of discovery prior to the finding out

of the proofs and the perception of their necessary connections,

he, however, did not go beyond that level of generality. In the

following passage he seems to refer to a post-discovery process of

reasoning which makes his position even more obscure:

So that we may in reason consider these four degrees: the
first and highest is the discovering and finding out of
proofs; the second, the regular and methodical disposition
of them, and laying them in a clear and fit order, to make
their connexion and force be plainly and easily perceived;
the third is the perceiving their connexion; and the
fourth, a making a right conclusion. These several degrees
may be observed in any mathematical demonstration: it being
one thing, to perceive the connexion of each part as the
demonstration is made by another; another, to perceive the
dependence of the conclusion on all the parts; a third,
to make out a demonstration clearly and neatly one's self;
and something different from all these, to have first
found out those intermediate ideas or proofs by which it
is made.[71]

2. Methods of discovery.

In view of Locke's vague and obscure position in relation

to the method of discovery it is relevant to try to see whether

he modelled his account of probability on the final cognition of

a demonstrative process, or on the process of discovery which takes

place in the mind prior to the discovery of the proofs which, by

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70. See ibid. pp 546-7;

71. Locke's Essay, p 568.

necessity, involves a process in which a portion of the ideas

inside the mind constituting likely proofs are looked into by

that mind in search of proofs which are connected in such a manner

as to provide certain knowledge.   If he modelled probability on

the final cognition at the end of the initial discovery process,

then the process of reasoning based on that model would be a post-

discovery process in both demonstrative and probabilistic thinking.

The reasoning task in such a case will be confined to the under-

standing, explanation, and application of what has already been

discovered.   It is a process in which at least the first three

steps mentioned by Locke in the passage cited above have been

achieved either by the same mind, or a different one.   The initial

discovery process, on the other hand, is different in many important

respects from the post-discovery stage and reasoning.   It is true

that the discovery of intermediate ideas, which necessarily prove

a general proposition, rendered the initial process of that discovery

for the most part an insignificant historical matter in relation to

that proposition and its discovered proofs.[72]   This however does

not alter the fact that the initial process is identifiable in terms

of its different problems, the mental task involved in dealing with

them, and the methods whereby that task is, or ought to be, carried

out.   To start with, it involves considering more ideas than the

discovered intermediate ones.   This poses a problem of relevance

which calls for a criterion whereby the ideas which are likely to be

intermediate proofs are isolated from the other numerous ideas in

the mind.   From that isolated portion of the mind proofs may or may

not be found.   If they are found non-proofs must also be eliminated,

and this is a task which involves other problems, the solution of

which may usefully be aided by suggesting a method, or prescriptive

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72. See below ch. 10 Section B.

norms, to facilitate it.[73]

Of course it is equally possible to argue that Locke did
not apply his mind to the problems of the reasoning process because
he considered it an internal or psychological process known, or
knowable, by only one person.[74] It is a fact that the analysis of
the reasoning tasks involved in that process, and the problems
they occasion, was first attempted by Wigmore, by simple analysis
of the elements of the evidence, without recognising any possibility
of prescriptive norms or canons of reasoning in complex cases.[75]
Prior to the current probability debate evidence scholars appreciated
very little of the nature, extent, or complexity of the intellectual
task involved in that process. This argument, however, lends more
support to my thesis that Locke modelled his account of probability
on demonstration as a final cognition. It would mean, however,
that he did not concern himself seriously with the problems of
inference; and that Gilbert did the same when he adapted Locke's
theory to construct his own theory of evidence. This is obvious
from the fact that Locke did not, apart from mentioning the scientific
method of discovery, raise or discuss any process problems. His
conscious, or unconscious, failure to deal with these problems is
sufficient evidence that he treated probability as a final cognition.[76]
It is approached and established in the same manner as a demonstration
is approached and established, except that a probability 'is
likeliness to be true.'.[77] Many citations from Locke in support of
this view have already been given. Like a discovered demonstrated
proposition a probability is a general proposition which can be

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73. See below ch. 10.

74. Locke's Essay, pp 567-8

75. See Wigmore, The Science of Judicial Proof, p 8.

76. 'An Achieved Cognition' is the equivalent of what is commonly referred
to in current writings on the philosophy of science as 'a finished research
report'. See below, ch. 10 Section B.

77. Locke's Essay, p 556.

established and detached from its proofs when men:

> [H]ave once with care and fairness sifted the matter as far
> as they could; and that they have searched into all the
> particulars that they could imagine to give any light to the
> question, and with the best of their skill cast up the
> account upon the whole evidence: and thus, having once found
> on which side the probability appeared to them after as full
> and exact an inquiry as they can make, they lay up the
> conclusion in their memories as a truth they have discovered;
> and for the future they remain satisfied with the testimony
> of their memories, that this is the opinion that, by the
> proofs they have once seen of it, deserves such a
> degree of their assent as they afford it. [78]

Implicit in this attitude of Locke is the assumption that the process

of discovery in probability is similar to the process of discovery

in establishing a demonstration. It is important here to point

out that our main concern with the process either of demonstration

or probability is confined to the problems which are raised in either

of these processes. It has got nothing to do with the psychological

nature of that process. It is not an inquiry into what takes place

in a particular mind or minds. It ought to be an inquiry into what

sorts of problems face anyone engaged in the process of discovery.

If the problems of the initial process of discovery of a demonstrated

proposition are different from those which arise in a probabilistic

discovery process, then the modelling of probability on demonstration

can be seen to face serious problems. [79]

E. The atomistic Nature of Lockean analysis.

As we have already seen, in Locke's account the ingredients

on which a mind works initially to discover the proofs of a proposition

have certain distinct qualities, (simplicity, distinctness,

adequacy, abstractness, and truth). We have also seen that since

all these ideas are open to introspection they require no evidence

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78 Ibid. pp 558-9

79. See below, chs. 5 and 10.

of their existence.   The probabilistic ingredients on the other hand
are markedly different.   Whereas knowledge, on Locke's account is
constituted by relations between ideas, probability is a relation
between propositions.   Locke referred to this when he stated:
'Probability, then, being to supply the defect of our knowledge, and
to guide us where that fails is always conversant about propositions
whereof we have no certainty, but only some inducements to receive
them for true.'[80]   This is so whenever someone receives the report
of a cognition from someone else.   In such a case the recipient
mind is often cut off from the subject of the reported cognition,
whether that subject be a sense-datum in a reported perception, or
proofs in the case of a general proposition.   This fact renders the
ingredients of a probabilistic process, completely distinct from
those of demonstration;   they are not simple, nor distinct and they
have no archetypes in the recipient's mind.   Locke however avoided
the whole issue when he moved away from the subject matter of
cognition to the source of its reporting.   He stated this as follows:

> That which makes me believe, is something extraneous to
> the thing I believe;   something not evidently joined on
> both sides to, and so not manifestly showing the agreement
> or disagreement, of those ideas that are under consideration.[81]

He referred to this as the grounds of probability.   And he stated
that these grounds are

> First, the conformity of anything with our own knowledge,
> observation and experience.[82]
>
> Secondly, the testimony of others, vouching their observation
> and experience.   In the testimony of others, is to be
> considered, (1.) The number.   (2.) The integrity.   (3.) The
> skill of the witnesses.   (4.) The design of the author,
> where it is a testimony out of a book cited.   (5.) The

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80.   Locke's Essay, p 557.

81.   Ibid. p 556.

82.   Ibid. p 557.

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consistency of the parts and circumstances of the relation.   (6.) Contrary testimonies.[83]

The first ground does not regard the correspondence of the report with the reported occurrence of the event reported.   It only means that it is impossible that it should have happened, or that it has, as a type, happened before.   His following example makes this abundantly clear:

> If I myself see a man walk on the ice, it is past probability, it is knowledge.   But if another tells me he saw a man in England, in the midst of a sharp winter, walk upon water hardened with cold; this has so great conformity with what is usually observed to happen, that I am disposed, by the nature of the thing itself, to assent to it, unless some manifest suspicion attend the relation of that matter-of-fact.   But if the same thing be told to one born between the tropics, who never saw nor heard any such thing before, there the whole probability relies on testimony: and as the relators are more in number, and of more credit, and have no interest to speak contrary to the truth; so that matter-of-fact is like to find more or less belief; though to a man whose experience has been always quite contrary, and has never heard of anything like it, the most untainted credit of a witness will scarce be able to find belief: as it happened to a Dutch Ambassador, who, entertaining the King of Siam with the particularities of Holland, which he was inquisitive after, amongst other things, told him, 'that the water in his country would sometimes in cold weather be so hard that men walked upon it, and that it would bear an elephant if he were there.'   To which the King replied, 'Hitherto I have believed the strange things you have told me, because I look upon you as a sober, fair man; but now I am sure you lie.'.[84]

In this light it can be seen that the main ground of probability is that of credibility.   This has very serious consequences for Gilbert's theory and for evidence theorizing in general.   It deflected the attention of evidence writers from evidence-conceived-of-as-facts to evidence-as-propositions about facts; with the inevitable result that facts as the materials of proof, the problems

83.   Id.

84.   Id.; Bentham made various references to this story in his writings on evidence, see 6 Works, pp 95, 96, 99-100.

they pose to the fact-finder, and the role they play in helping

him to achieve his task, received very little attention in the

rationalist tradition.   It is true that the immediate object of

the recipient's mind when another person tells him something is

'the reported psychological state of the mind of that person.

That report, logically speaking, does not prove a fact; all that

it does is to assert a proposition about it.'.[85]   The proposition

may be true or false insofar as it is a true or false report of what

happened or did not happen.   While the credibility of the report

is an important factor, its treatment as the only or even the main

indicator of truth tends at least to play down the role of facts in

judicial proof.   This, so far, has resulted in purely abstract and

logical discourse about the problems of judicial fact finding.

Most of these problems are process problems which were not posed or

discussed by the empiricist philosophers.   The individual case

and its problems are completely ignored; the treatment of the

problems of judicial proof is abstract and general; and the tradition

aspires generally to construct a general deductive system, instead

of offering a method for the solution of particular problems in

particular circumstances.   The reconstructed model of the

particular case as a paradigm of the alleged occurrence in a

particular fact finding situation is probably the most appropriate

standard of comparison.[86]   This will require a shift of emphasis

from ideas in the mind to happenings outside the mind.   It is

surprising that Locke recognised this in the case of substance, but

did not extend it to probabilities, when he stated;

> In our search after the knowledge of substances, our want
> of ideas that are suitable to such a way of proceeding

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85.   See below ch. 2 Section D.

86.   See below ch. 10.

obliges us to a quite different method. We advance
not here, as in the other, (where our abstract ideas
are real as well as nominal essences,) by contemplating
our ideas, and considering their relations and
correspondencies; that helps us very little, for the
reasons that in another place we have at large set down.
By which, I think, it is evident that substances afford
matter of very little general knowledge; and the bare
contemplation of their abstract ideas will carry us but
a very little way in the search of truth and certainty.
What then are we to do for the improvement of our
knowledge in substantial beings. Here we are to take a
quite contrary course; the want of ideas of their real
essences sends us from our own thoughts to the things
themselves as they exist. Experience here must teach
me what reason cannot: and it is by trying alone that
I can certainly know what other qualities co-exist with
those of my complex ideas, v.g., whether that yellow,
heavy fusible body I call 'gold' be malleable or no;
which experience (which way ever it prove in that
particular body I examine) makes me not certain that
it is so in all or any other yellow, heavy, fusible
bodies, but that which I have tried.[87]

For both Locke and Gilbert the grounds of probability

are inducements to accept a proposition as true. This position

creates a number of process problems of which it is sufficient to

mention the following at this stage. The first problem relates

to the question of what grounds should lead the fact-finder to

accept the proposition in question. I have argued before that

Gilbert appealed to the fact that the witness was on oath as a

guarantee of his credibility, and probably the truth of his report.

However, this avoids, without solving, the problem of the truth

of these reports. The task of the fact-finder according to the

Gilbertian view is the ascertainment of relations of agreements

and disagreements between the different ideas.[88] Gilbert

probably had this in mind when he stated 'probability arises

from the Agreement of any Thing with a Man's own Thoughts and

Observations from the Testimony of others who have seen and heard

it.'.[89] Thus an assumption he makes uncritically is that witnesses

87. Locke's Essay, pp 547-8

88. Ibid. p 424 et seq.

89. Law of Evidence, p 104.

on oath are credible. As we shall see, Bentham assumed that all witnesses are _prima_ _facie_ credible;[90] and the positions of Stephen[91] and Wigmore[92] are not different.

Another problem, relates to the point of time in the process when the report of a witness is assessed as true or false. Is it, for example, assessed sequentially, when first made, or only when related to other propositions at the end of the trial process? A third problem relates to the question whether all the admitted items of evidence constitute 'proofs'. We shall deal with this problem again in parts two and three of this thesis. Meanwhile it is logical to state here that David Schum treats each and every item of relevant evidence as a 'proof'.[93] Jonathan Cohen on the other hand presents the fact-finding process as an eliminative process, but he does not offer any guidance as to how the elimination takes, or ought to take, place.

In conclusion it can be asserted that whatever the intention of Gilbert may have been he did not deal with process problems, including the 'role of facts' in proof, and from this it can be concluded that he, like Locke, treated both demonstration and probability as achieved cognitions. Since I am arguing that the main problems of judicial proof are process problems, it follows that Gilbert and the rationalists generally either fail to see those problems, or ignore them, or approach them in an atomistic or sequential manner, as will be argued in this thesis.

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90. See below, ch.2 pp. 74 _et_ _seq_

91. See below, ch. 3 p. 93.

92. See below, ch. 3 p. 106.

93. See below, ch. 7, n. 3 and above ch.1, n. 51.

CHAPTER TWO

BENTHAM AND THE SUBJECT MATTER OF EVIDENCE

Introduction

In this chapter I shall deal mainly with those parts of
Bentham's writings which relate to evidence conceived of as facts,
and whatever pertains to it in that perspective.[1]   This will
include his notion of evidence and his treatment of problems the
proof of facts poses for the fact-finder;   the relationship of his
treatment to his philosophical thought;[2] and finally how he views
the task of the fact-finder, and what assistance his views offer

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1. For Bentham, the primary end of adjudication in its relation to
justice under the law is rectitude of decision, not involving preponderant
expense, vexation or delay, see 7 Works, pp 7-12.   Thus the duty of
the Legislator, whom Bentham addressed, (ibid. p 12) is;   (1.) to secure
the 'existence' and forthcomingness of evidence, ibid. p 12, (this
allowed Bentham to include extraction, ibid. bk. 3, and pre-appointed
evidence, ibid. bk. 4.);   (2.) to ensure its completeness: no evidence
should be excluded except where the collateral ends of justice so
demand, (this allowed him to discuss the technical system, ibid. bk.8,
and attack its improper exclusions, ibid. bk. 9. and to offer and
explain his natural system, ibid. bk. 9. ch. 2., and criticise the
false ends and theories of the technical system, 6 Works, pp 10, 143
et seq;   (3) to ensure its correctness by giving it its due weight (so
as to guard against deception).   This allowed him to treat the various
cases of correcness and incorrectness, see for example, 6 Works, bk. 1.,
the securities for correctness, ibid. bk. 2, the different classification
of evidence into direct, circumstantial (7, Works, bk. 5), makeshift
(ibid. bk. 6);   the discussion of the persuasive force of evidence,
(ibid. bk. 1, ch. 5.).   To this last part he related his ontological,
(8 Works, pp 195-211), logical (ibid. pp 215-293), and linguistic views,
(ibid. pp 294-338).   Our present concern is with (3.).   Secondary
sources as to (1) and (2) are, G. W. Keeton et al, (eds.);   Jeremy
Bentham and the Law, (1948);   W. Twining, Bentham on Evidence, (forthcoming);
see also above;   M. Mack, A Bentham Reader (1969) pp 209-239.

2. For the influence of early empiricist philosophers on Bentham see
M. Mack, Jeremy Bentham: An Odyssey of Ideas 1748-92. (1962), ch. 3.;
G. Postema 'Facts, Fictions, and Law: Bentham on the foundations of
evidence', in W. Twining (ed.), Facts in Law, (1983), p 37 at pp 39,
48, 49, 51;   Ross Harrison, Bentham, (1983) chs. 3-4.

the fact-finder to carry out that task.[3]

A. Judicial Evidence

Bentham saw evidence as a generic term of which judicial evidence
is a species distinguishable only by the purpose to which it is put,
and the subject matter to which it applies.[4] From the very beginning
he emphasized its relational character[5] and then defined it as follows:

> By the term evidence, considered according to the most
> extended application that is ever given to it, may be, and
> seems in general to be, understood, any matter of fact, the
> effect, tendency, or design of which, when presented to
> the mind, is to produce a persuasion concerning the
> existence of some other matter of fact - a persuasion
> either affirmative or disaffirmative of its existence.[6]

Evidence, thus, is a relation between two facts.[7] Bentham termed
the fact to be proved the 'principal' fact and the fact offered in
proof of that principle fact the 'evidentiary' fact.[8] Evidence
in this sense, according to Bentham, is used in every day life, in
domestic, social, philosophical and scientific inquiries.[9] What

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3. The study in this chapter is based primarily on Bentham's original
sources. However great assistance has been derived from the following
secondary sources: C. K. Ogden, Bentham's Theory of Fictions, (1932);
Mary Mack (1962) op.cit. chaps. 1, 3, 4 and 6; H. L. A. Hart, Essays on
Bentham, (1982); G. Postema, op.cit.; W. Twining 'The Rationalist
Tradition of Evidence Scholarship', in Waller and Campbell (eds.), Well
and Truly Tried (1982); W. Twining 'Rule-Scepticism and Fact-Scepticism
in Bentham's Theory of Evidence', in W. Twining (ed.) Facts in Law, (1983)
p 65; W. Twining Bentham on Evidence (forthcoming); E. Halévy, The
Growth of Philosophic Radicalism, (1966); R. Harrison, Bentham, (1983).
For a biographical account see W. Twining 'The Rationalist Tradition',
op.cit. pp 218 et seq; P. Edwards (ed.),Encyclopaedia of Philosophy,
(1967-1972). Simpson, Biographical Dictionary of the Common Law (1984);
Bentham's MSS on evidence and procedure add nothing significant to the
published works on the subject of this thesis.

4. 6 Works, pp 209-210.

5. Ibid. p 208.

6. Id.

7. 6 Works, p 214.

8. Ibid. p 215.

9. Ibid. pp 208-9.

makes judicial evidence distinguishable from every other species of
evidence is its relation to principal facts.   These principal facts
are

> [T]hose facts, which, on the occasion of each individual
> suit, are the facts sought, for the purpose of their
> constituting the immediate basis or ground of the decision:
> insomuch that, when a mass of facts of this description,
> having been sought, is deemed to have been found, the
> decision follows of course, whether any other facts be
> considered as found or not.[10]

The principal facts are defined and determined by the substantive
law.   The relationship between principal facts and evidentiary
facts is now known as relevance.   Bentham did not refer to it as
such simply because he did not express any opinion on what constitutes
that relationship.   For Bentham

> [T]o trace the connexion between the several principal
> facts (whether individual facts be meant, or species of
> facts,) and the several evidentiary facts respectively
> related to them in that character, would be, practically
> speaking, if not strictly and literally, an endless task:
> at any rate, it will not be attempted here.[11]

It is important to observe here that though Bentham did not
define or mention relevance he implies that it had to do with weight,
because what he thought he had avoided is an investigation and
discussion of the operation of weighing and judging the degree and
closeness of connection which

> [H]as been an operation of the instinctive class: an
> operation which has never been attempted to be subjected
> to rule, or at least to any other rules than what have
> been completely arbitrary and irrational.   To take the
> business out of the hands of instinct, to subject it to
> rules, is a task which, if it lies within the reach of
> human faculties, must at any rate be reserved, I think,
> for the improved powers of some mature age.[12]

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10.   Ibid. p 215 for a different meaning of 'principal facts' see
n.13 below.

11.   Ibid. p 216; but see his views on proper exclusion of irrelevant
evidence, 7 Works, p 362.

12.   6 Works, p 216.

This, as we shall see, is similar to Wigmore's and other evidence scholars viewing of relevance as probative force, a view which poses some serious problems for the analysis of the examination and combination of evidence. As we shall see such a view is not warranted by, and is indeed inconsistent with, Bentham's abstract analysis of facts as seen in general experience, and not in any particular context or relations. His abstract analysis of facts can best be seen in his treatment of direct and circumstantial evidence. To that treatment we shall now turn.

B. Facts as Evidence

1. Classification of Evidence.

Bentham distinguishes between two types of evidentiary facts and their relation to principal or ultimate principal facts. The type of facts which have direct relationships to the ultimate principal facts he termed direct evidence.[13] The other type of facts whose relationship to the principal or ultimate facts is indirect or circumstantial he termed circumstantial evidence. Bentham's treatment of direct evidence was part of his treatment of circumstantial evidence.[14] His interest in direct evidence was threefold; one was to distinguish

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13. See 7 Works, p 2 when he stated with reference to chains of inferences in circumstantial evidence 'In this way, a chain of facts, of any length, may be easily conceived, and chains of different lengths will be frequently exemplified: each such link being, at the same time, with reference to a preceding link, a principal fact, and with reference to a succeeding one, an evidentiary fact.... In a chain of this sort, it becomes necessary to distinguish the several precedential or introductory facts (principal and evidentiary) from the ultimate principal fact. The ultimate principal fact occupies that situation only: it is the very fact sought: it is not viewed for the purpose of inducing a persuasion of the existence or non-existence of any other fact.'.

14. Ibid. pp 2-3.

it from circumstantial evidence, whilst the other was to argue that
most types of direct evidence involved some elements of circumstantial
evidence, the third was to show that direct evidence has more probative
force than circumstantial evidence.   The discussion of direct and
circumstantial evidence contains some of Bentham's most advanced and
interesting views about facts as evidence.

Bentham saw the distinguishing feature between the two types
of evidence in the reasoning steps the mind takes from the evidentiary
fact to the principal fact.   In direct evidence the mind moves from
the evidentiary fact directly to the principal fact.   In circumstantial
evidence on the other hand it takes more steps to reach the principal
or ultimate fact.   No reasoning from any item of circumstantial evidence
can be done in less than two moves from the evidentiary fact to the
ultimate fact.   The mind moves from an evidentiary fact (factum
probans) to a principal fact (factum probandum), and from that to the
ultimate fact i.e. the fact in issue.   Bentham treated this reasoning
chain as the distinguishing feature of circumstantial evidence and
he referred to it as special inference.

> When all the evidence is of that sort which is termed
> direct, no part of it of the nature of circumstantial,
> the case is such as affords not room for any special
> inference – for any other inference than that general
> one, by which, from the discourse by which the existence
> of this or that fact is asserted, the existence of that
> fact is inferred, and credited.[15]

That is, in direct evidence the only inference involved is that
whereby one infers the existence of something from the testimony of
its existence.   So, as Bentham says, direct evidence does not require
any chain of reasons, or a special inference, because

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15.   7 Works, p 1.

⌐I⌐n the case of direct evidence, the evidentiary fact is
throughout of an uniform description.   It consists in the
existence of a person appearing in the character of a deposing
witness, and, in the way of discourse, asserting the existence
of the principal fact in question, on the ground of its
having, in some way or other, come within the congnizance
of his perceptive faculties.[16]

After stating this clear distinction Bentham went on to make

important observations about evidence.   He maintained first that it

is hard to find a case in which the evidence consists entirely of

direct evidence.[17]   As an example he gave the issue of intention in

criminal trials:

> In a case regarded as criminal, the body of evidence (unless
> it consists of confessorial evidence) cannot, if complete, be
> composed solely of direct evidence: how satisfactory soever,
> it cannot but include a mixture of circumstantial evidence.
> For, to constitute a criminal act, one or more facts of the
> psychological kind are indispensably requisite: in most
> instances, the sentiment of _consciousness_, with relation to
> the existence of divers exterior facts; in all cases,
> _intentionality_, viz. the intention of bringing about the
> obnoxious event, or at least of doing the physical act by
> which it is produced or endeavoured to be produced.[18]

Bentham also saw perception as normally an inferential process of

judgment.[19]

> Simple perception is the operation of sense; inference is
> the operation of the judgment.   But, by the most constantly
> in exercise of all the senses, viz. _sight_, it is seldom that
> any belief of any matter of fact is produced, but that the
> judgment has been more or less at work in the production of
> it.[20]

Bentham made this important observation and left it at that

without trying to show whether or not it is consistent with his clear-

cut distinction between direct and circumstantial evidence.   Nor did

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16. _Ibid_. p 2.

17. _Id_.

18. _Id_.

19. Bentham referred to Berkeley's _Essay Towards a New Theory of Vision_
(1709), see 8 _Works_, n.p.3. His reference to Berkeley seems problematic
since Berkeley argued that real perception involved no inference. Of
course much of what we call perception is not perception for him, see G.
Berkeley, _A New Theory of Vision and Other Writings_, (1709, 1910-39) pp 13-86.

20. 7 _Works_, p 3.

he relate it to his discussion of the sufficiency of direct evidence.

The most important category of facts mentioned by Bentham in this respect relate to the numerous facts which are assumed or pre-supposed, by anyone when perceiving judging or communicating with someone else, or when perceiving, interpreting, believing, or acting on any such communications, ie., <u>facts of experience.</u>[21]   Accordingly all the facts constituting the basis of the background and supporting beliefs for action are, according to Bentham, circumstantial evidence of the basis of every assertion of direct evidence.   Bentham made this observation in relation to testimony when he stated

> The evidence afforded by any given mass of testimony is either direct or circumstantial, according to the relation it bears to the fact to which it is considered as applying. It is direct, in respect of any and every fact expressly narrated by it; and, in particular, every fact of which the witness represents himself as having been a percipient witness.   It is circumstantial, in respect of any and every fact not thus expressly narrated by it; in particular, every fact of which the witness does <u>not</u> represent himself as having been a percipient witness, and the existence of which, therefore, is matter of inference, being left to be concluded from its supposed connexion with the facts spoken to by the testimony in its character of direct evidence.[22]

His conception of background knowledge as evidence was clearly and vividly stated in relation to what he considers to be improbable or impossible.

> The direct evidence, from which this inference of the non-existence of the affirmed fact is deduced, is composed of the several supposed reports or relations (added to the several supposed perceptions of the deposing witness himself) whereby the existence of the several supposed analogous facts of which the course of nature in this behalf is composed, has been supposed to be affirmed.[23]

Bentham referred to general experience in that respect as general

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21. <u>Ibid</u>, p 4. for a reference to these facts as 'evidence' see Thayer, <u>op.cit.</u> p 270.

22. 7 <u>Works</u>, p 3.

23. <u>Ibid.</u> p 98.

counter-evidence, and to the direct testimony as special counter-evidence.

> Certain facts are considered as disaffirmed, certain
> negative facts in infinite multitude are considered
> as affirmed, by the perceptions and reports (extra-
> judicial reports indeed) of mankind in general, without
> any known exception: and from all these facts put together,
> in the character of evidentiary facts, the non-existence of
> the individual fact in question in the character of
> principal fact is inferred.[24]

Again Bentham made the same observation in relation to what he terms infirmative supposition when this concerns circumstantial evidence. He stated this in the following passage: 'it will often happen, that, by the bare consideration of some other fact, which is not proved, nor so much as attempted to be proved, the principal fact will be considered as being, in a greater or less degree disprobabilized.'[25]

The next matter considered by Bentham was the effect of both direct and circumstantial evidence. According to Bentham when any item of direct evidence is believed by the fact finder then

> The persuasion generated by it in the mind of the judge is
> of sufficient strength to give birth to a decision on his
> part; together with such acts of power, to which, on the
> occasion in question, a decision to the effect in question
> is in the habit of giving birth.[26]

The same is not true of a single item of circumstantial evidence.

> By some greater number of such lots of circumstantial evidence,
> taken together, the fact may be said to be proved.   Of the
> probative force of any one of them, taken by itself, the utmost
> that can be said is, that by means of it the fact is
> probabilized:- rendered, in a greater or less degree, probable.[27]

Though Bentham considered evidence as facts and discussed it, the facts he looked into and considered are facts in general human

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24. Id.

25. 7 Works, p 4, See W. Twining, Bentham on Evidence, op.cit.,

26. 7 Works, p 4.

27. Id.

experience, seen and analysed in that general context.[28] In that

general context judicial evidence was distinguishable only by the

judicial purpose to which it is put (i.e. the connection of evidentiary

facts with the determinable principal facts).[29] He talked about

the properties of judicial evidence in relation to the ends of justice

(i.e. correctness and completeness).[30] He also talked in general about

what causes correctness and incorrectness in evidence, and what is

necessary for securing the completeness of evidence.[31] By adopting

so general an approach to the analysis of evidence Bentham, as we have

seen, did not attempt to relate his analysis to what is involved in

the performance of any fact finding task in relation to a typical

type of situation in which that task is performed. Had he done that

he would have treated such issues as relevance; probative value;

the credibility of witnesses; the weighing of conflicting and mixed

evidence; the question of whether the reasoning process is eliminative

or combinatory; and numerous other issues, in the context of the

judicial fact finding type of situation.[32]

Probably Bentham saw that such treatment would be inconsistent

with his scientific approach,[33] and his purpose of addressing the

legislator on the design of a rational system of procedure that should

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28. 6 _Works_, pp 208-215, 217-219, 286-287, 278.

29. _Ibid._ p 215.

30. _Ibid._ p 211.

31. _Ibid._ pp 205, 213, 211.

32. See below ch. 10, Section A.

33. 6 Works, pp 204-205; and 209 when he stated: 'In the map of
science, the department of judicial evidence remains to this hour a
perfect blank. Power has hitherto kept it in a state of wilderness:
reason has never visited it.... The present work is the result of an
attempt to fill up this blank, and to fill it up with some approach
towards completeness.'.

be given by the legislator for the guidance of the judge.[34]   His

position in relation to relevance as we have seen, is a case in point.

Before we proceed any further into these matters and other

aspects of Bentham's writing on evidence, especially his views on

probative force and probability, it is important to try to seek an

explanation for his rather unusual and problematic reference to facts

and his treatment of them.   Such an inquiry will carry us into

Bentham's writing on ontology and epistemology.

C.   The Intellectual Foundations of Bentham's Writings
     On Evidence.

1. General.

Bentham referred to facts in various and differing senses.

Facts are physical or psychological, general or especial, real or

fictional, facts of existence or facts in discourse, mental facts or

material facts.   His most striking and interesting reference to

facts, as we have seen, is when he treated as facts what is currently

known as common sense generalizations or beliefs and opinions about

the course of nature.   His following definition of fact can be taken

as a starting point for our inquiry: 'The existence of any expressable

state of things, or of persons, or of both, whether it be quiescent,

or motional, or both, at any given point or portion of time, is what

is called a fact, or a matter of fact.'.[35]   The two words existence

and expressable are the key words in this passage.   As I shall argue

Bentham viewed existence in different relations but his 'expressable

existence' is linguistic.   This position renders Bentham's views on

the relationship between reality, thought and language a relevant

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34. See 7 Works, p 64; 6 Works, pp 209 et seq; W. Twining 'Rule-
Scepticism and Fact-Scepticism', op.cit., p 65 at 69.

35. 8 Works, op.cit. p 300.

consideration for our present purposes.

2. <u>Reality</u>.

Bentham unlike Hume and very much like Locke[36] adopted a pragmatic and a commonsense view of the existence of the material world.[37] He expressed this in the following:

> I assume in a word the existence of what is called the material world... and that without scruple: notwithstanding it has been the subject of so much controversy. I assume it boldly for this reason: because in point of practice, no bad consequences can as everyone is ready to acknowledge possibly arise from supposing it to be true, and the worst consequences cannot but arise from supposing it to be false....[38]

As a practical justification of this stance, Bentham invoked his principle of utility.[39] 'Suppose the non existence of corporeal substances, of any hard corporeal substances that stand opposite to you, make this supposition, and as soon as you have made it, act upon it, pain, the perception of pain, will at once bear witness against you: and that by your punishment, your condign punishment.'.[40]

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36. See Mary Mack, <u>op.cit.</u> p 205.

37. See Locke's <u>Essay</u>, p 537 where he stated 'The notice we have by our senses of the existing of things without us, though it be not altogether so certain as our intuitive knowledge, or the deductions of our reason employed about the clear abstract ideas of our own minds; yet it is an assurance that deserves the name of knowledge. If we persuade ourselves that our faculties act and inform us right concerning the existence of those objects that affect them, it cannot pass for an ill-grounded confidence: for I think nobody can, in earnest, be so sceptical as to be uncertain of the existence of those things which he sees and feels. At least, he that can doubt so far, (whatever he may have with his own thoughts,) will never have any controversy with me: since he can never be sure I say any thing contrary to his opinion. As to myself, I think God has given me assurance enough of the existence of things without me; since, by their different application, I can produce in myself both pleasure and pain, which is one great concernment of my present state. This is certain, the confidence that our faculties do not herein deceive us is the greatest assurance we are capable of concerning the existence of material things.'.

38. See University College Collection Box 69, p 52.

39. For the same justification by Locke see, Locke's <u>Essay</u>, p 537.

40. 8 <u>Works</u>, p 197.

From this confident and uncompromising assumption Bentham proceeded to state his ontological, logical and epistemological views. Through that assumption he could see the material world as independent of the mind, any mind, and from language. In this way he conceived the material world as an aggregate of concrete objects or substances. The substance or an object is not, according to Bentham, matter, form, quality or relation. None of these exists in what Bentham termed the material world. Only substances have real material existence.[41]

3. Mental Existence.

Bentham saw the material world as a cause or source of another type of existence, i.e. mental existence. When a mind comes into contact with a substance or a thing in nature it has an impression or idea of that thing. According to Bentham, and unlike Locke, these ideas and impressions enter the mind in a composite form. By reflection the faculties of the mind de-compose that sensory manifold into simple ideas. Bentham referred to both the composite and de-composed ideas as real mental entities. He referred to this in the following

> Under the head of perceptible real entities may be placed, without difficulty, individual perceptions of all sorts: the impressions produced in groups by the application of sensible objects to the organs of sense: the ideas brought to view by the recollection of those same objects; the new ideas produced under the influence of the imagination, by the decomposition and recomposition of those groups; – to none of these can the character, the denomination, of real entities be refused.[42]

Reality here is simply the consciousness of the mind of its own contents. The mind when reflecting on its own ideas can identify each of its ideas and be aware of its existence. For Bentham permanence and solidity are not essential for reality.[43] His

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41. Ibid. pp 199 et. seq.

42. 8 Works, p 196.

43. Id.

definition of real propositions as intellectual or volitional expressing

propositions lends support to this view.[44]   In the light of the

preceding discussion, it can be maintained that the recent presentation

by Professor Gerald Postema of what constitutes real entities is

inaccurate.   According to Professor Postema 'All real entities, in

Bentham's view, fall into one or two classes: (i) concrete material

substances, and (ii) mental entities which, following Hume, he

distinguishes into impressions and ideas.   All other entities to

which language seems to commit us are fictions.'.[45]   Professor Postema

expressly excluded decomposed simple ideas from the realm of real

entities.   For Bentham both the contents of a person's mind and the

physical world are real.   No problem of the correspondence of what

exists in someone's mind in relation to what exists outside it is raised

as far as that person is concerned.   The assumption that the mind has

all it's ideas lodged inside it disposes of any need for communication.

In short it is not a communicating mind.   When Bentham considers

communication he enters upon one of his greatest contributions to

human thought.   By this I do not intend to be understood to ignore

or undermine the importance accorded by Bentham to the intransitive

use of language in the formation and improvement of thought.   My main

concern here is to make a distinction between what really exists mentally

and physically in order to make the further distinction between these

two and what exists in language.   My main argument so far can be

restated as follows: for Bentham when material reality is perceived

by someone he treats his perceptions as ones of real things, and when

he communicates what he has perceived (logically speaking, expresses a wish

to be understood as communicating that reality) the only way he can

carry out that communication is by means of signs.

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44. 8 Works, p 333.

45. G. Postema, op.cit. p 46.

The treatment of the problem of communication will take us through a section in which we have to consider Bentham's theory of fictions in relation to language, thought and reality.

4. Reality, thought and language.

We have already seen that Bentham made a distinction between material and mental entities; a distinction by which he contrasted what exists in a percipient mind with what exists in the material world. When he turned to the problem of communication he made a further distinction between real and fictitious entities, for this distinction the real archetype was material or physical entities, i.e. sensible objects. According to this view the only real entities are sensible material objects; all other entities are fictitious.

> By a real entity, understand a substance, - an object,
> the existence of which is made known to us by one or
> more of our five senses. A real entity is either a
> person or a thing, a substance rational, or a substance
> not rational.[46]

These substances provide the mind with a composite bundle of ideas.

> No portions of matter ever presents itself to sense,
> without presenting, at one and the same time, a multitude
> of simple ideas, of all which taken together, the concrete
> one, in a state more or less correct and complete, is
> composed. At the same time, though initially all these
> ideas present themselves together, the mind has it in its
> power to detach, as above, any one or more of them from
> the rest, and either keep it in view in this detached state,
> or make it up into a compound with other simple ideas,
> detached in like manner from other sources.[47]

The mind operates on these composite images to make simple abstract ideas; ideas which have no physical or material existence in nature: such as matter, form, shape, colour, quality, quantity and relation. All these ideas are decomposed by mental analysis from the composite

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46. 8 Works, p 325.

47. Ibid. p 26; See also G, Postema, op.cit. p 49.

images received from the material world by the passive faculties of the mind. Bentham did not seem to view these ideas as states in any particular mind, but as signs in language; for when he considered decomposed ideas from the point of view of the percipient mind he regarded them as real entities.

Sensible physical objects stand in certain relations to each other. A real entity, for example, is either in a state of rest or motion. According to Bentham 'when a real entity is said to be at rest, it is said to be so with reference to some other particular real entity or aggregate of real entities...'[48] Motion, rest, time and space though related to real entities are themselves all fictitious entities. All quantities and qualities are fictitious as well.

Bentham emphasized the dependence of these non-real entities on concrete physical objects, not only to indicate their non-physical ontological status, but to show also that important logical and epistemological issues relating to fictitious entities can be resolved with reference to the real entities on which they depend. It is, however, important to point out that Bentham's distinction between what is real and what is fictitious in relation to language is based on a dichotomy between what exists in the material world contrasted with what exists in discourse independent of any mind. For this reason, it seems that Bentham assigns the ontological existence of the fictitious entities to language when he states that '[t]o language, then - to language alone - it is, that fictitious entities owe their existence - their impossible, yet indispensible, existence.'.[49]

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48. 8 Works, p 197.

49. Ibid. p 198.

This however does not mean that fictitious entities have no other
non-physical existence besides their existence in language.   We
have already seen that Bentham regarded the mind as a seat of existence
independent of language, and probably the material world.   His
treatment of physical and non-physical entities that are independent
of any mind, enable him to contrast the names of objects with the
names of non-objects.[50]   Bentham's idea of existence as a fictitious
entity lends support to this view.[51]   Another dependence relationship
between physical and fictitious entities is that the names of concrete
sensible objects serve as the archetypes for those of fictitious
entities.[52]   Fictitious entities being non-objects, cannot be
designated or denominated in a direct way.

> Of one and the same thought, from mind to mind, by what
> means - through what channel can conveyance be made?   To
> no other man's is the mind of any man immediately present.
> Matter, this or that portion of matter external to both,
> in this may be seen the only channel, the only medium,
> which the nature of the case admits of.   Yonder stands a
> certain portion of matter.   By that portion of matter
> feelings of a certain sort are produced in your mind:
> by that same portion of matter feelings of a sort, if not
> exactly the same, at least, with reference to the purpose
> in question, near enough to being the same, are produced,
> at the same time, in my mind.   Here, then, is the channel
> of communication, and the only one.   Of that channel
> language takes possession and employs it.[53]

According to Bentham the association between the idea of a name and
the object to which it is applied created a natural propensity whereby
reality is attributed to any object designated in that manner.
Fictitious entities have no material existence yet they have names;
a circumstance which forces us to speak of them as though they were
real entities.   For this reason Bentham thought that fictitious
entities are easily confounded with real entities.   To avoid that

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50.   Ibid. pp 198-199.

51.   Ibid. p 206.

52.   Ibid. pp 331-332.

53.   Ibid. p 329.

serious consequence he made his distinction between real and fictitious
entities.

> Unfortunate it is, howsoever necessary and indispensible,
> that for speaking of fictitious entities, there is no
> other possible mode than that of speaking of them as if
> they were so many real entities.   This blameless falsehood
> being universally uttered, and remaining universally
> uncontradicted, is, to a considerable extent, taken for
> truth.   With every name employed, an entity stands associated
> in the minds of the hearers, as well as speakers, and that,
> entity, though in one half of the whole number of instances,
> no other than a fictitious one, is, in all of them, apt to
> be taken for a real one.   To speak of an object by its
> name, its universally known name, is to ascribe existence
> to it, - out of this, error, misconception, obscurity,
> ambiguity, confusion, doubts, disagreement, angry passions,
> discord and hostility have, to no inconsiderable amount,
> had place.[54]

To this long list of the dangers of confounding what is fictitious

with what is real, Bentham added a serious defect inherent in language

as a medium of communication.   When language is used as a medium of

communication, it expresses what the speaker wishes the hearer to

take for his state of mind in relation to a matter of fact alleged

to have past, present, or future existence in nature, or in the mind

of the speaker.   The object of communication itself cannot be

mirrored by the speaker's discourse.   Bentham maintained that the

only object of communication is the state of the communicator

mind, i.e., of the volitional or the perceptive faculties of the

mind.

> When, as above, desire, (the state or act of the will,)
> and simple perception or sensation, (the state or act of
> the understanding,) are excepted, all that the mind of
> man is capable of containing is an act of the judicial
> faculty - an opinion, a judgment: an opinion entertained
> by himself, entertained in his own mind.   This is the
> only immediate subject of any communication which,
> concerning the state of that faculty, can be made.   Of no
> matter of fact, external to, of no matter other than that
> which passes in his own mind, can any immediate communication
> be made by language.   Opinion, an opinion entertained by
> the speaker, this is all of which, in any instance,

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54. Ibid. pp 327-8.

> communication can be made. Of an opinion thus expressed
> any imaginable matter of fact, real or supposed, may have
> been taken for the object. But that to which expression
> is given, that of which communication is made, is always
> the man's opinion, i.e. that which, in so far as the
> expression answers its intended purpose, that which he
> wishes should be taken for his opinion in relation to the
> subject in question, nor anything more.[55]

For Bentham the ascertainment of the import of any discourse, (not

the discourse itself), involves a high degree of complexity which

calls for going beyond the discourse itself to ascertain its meaning

or truth as the case may be. The making of the distinction between

discourse and its import, together with Bentham's emphasis on the

dependence of fictitious entities on real entities, are indicative

of Bentham's intention to go beyond the location of the ontological

status of fictitious entities to deal with the more important logical

and epistemological questions relating to fictitious entities.

Bentham's discourse on logic, though fragmentary and probably incomplete,

contains some general remarks on what an investigator may look into

additional to fictitious entities, or any discourse about any matter

of fact, to ascertain the truth or falsity of any communication relating

to either.[56] Bentham's views on the truth value and instructiveness

of propositions about fictitious entities may be of some help here.

He seems to regard the truth and instructiveness of propositions about

fictitious entities to be the function of the real entities on which

they depend. He stated this as follows

> Nothing has no properties. A fictitious entity being, as
> this its name imports, being, by the very supposition, a
> mere nothing, cannot of itself have any properties: no
> proposition by which any property is ascribed to it can,
> therefore, be in itself, and of itself, a true one, nor,

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55. Ibid. p 321.

56. I have not looked at Bentham's MSS on logic because they are not
edited and a search in them is beyond the scope of this work.

> therefore, an instructive one. Whatsoever of truth is
> capable of belonging to it cannot belong to it in any
> other character than that of the representative - of the
> intended and supposed equivalent and adequate succedaneum,
> of some proposition having for its subject some real
> entity.[57]

These real entities on which the import of fictitious entities is
based were referred to by Bentham as the real source, efficient cause,
connecting principles.[58] The import of the real entity provides an
emblem or archetypal image for the import of the fictitious entity.[59]

> By the sort of proposition here in question, viz., a proposition
> which has for its subject some fictitious entity, and for
> its predicate the name of an attribute attributed to that
> fictitious entity, some sort of image - the image of some
> real action or a state of things, in every instance, is
> presented to the mind. This image may be termed the archetype,
> emblem, or archetypal image appertaining to the fictitious
> proposition, of which the name of the characteristic
> fictitious entity constitutes a part.[60]

According to this view the truth of a fictitious proposition predicating
a 'quality' or 'property' of a fictitious entity can only be ascertained
with reference to the archetypal image of that proposition, i.e., that
which provides the archetype for the proposition about the fictitious
entity.[61] Bentham seems to suggest this when, in his section on
invention, he states that 'If the subject of the physical class, insofar
as the words employed in discoursing of it are names of fictitious
entities, take the only course by which it is possible for a man to
give a perfect clearness to the ideas of which they serve to constitute
the design, viz., by searching out the real entities in which these
names of fictitious entities have their source.'.[62] In what follows

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57. Ibid. p 246.

58. Id.

59. Id.

60. Id.

61. 8 Works, pp 333, 336.

62. Ibid. p 277.

we shall consider generally the extent to which Bentham's views on ontology, language, and logic influenced his writings on evidence.

D. Evidence and probability

1. The Immediate Object of Evidence Reports and its Analysis

Bentham in his writings on evidence maintained a clear distinction between reality, thought, and language.[63] Real existence is always certain and absolute:

> Take any supposed past matter of fact whatever, giving
> to it its situation in respect of place and time. At
> the time in question, in the place in question, either
> it had existence, or it had not: there is no medium.
> Between existence and non-existence there is no medium,
> no other alternative. By probability - by improbability, -
> by each of these a medium is supposed - an indefinite
> number of alternatives is supposed.[64]

When a witness testifies to the existence or non existence of a matter of fact he expresses a persuasion actual or assumed in its existence or non existence.[65] This persuasion is not an objective property of the fact to which he testifies.[66] Unlike the objective fact the persuasion is susceptible of different degrees, ranging from certainty to impossibility.[67]

> In and by the form of words thus employed for giving
> expression to that which is in truth nothing more than
> a psychological matter of fact, the scene of which lies
> in, and is confined to, his own breast, - a sort of
> quality is thus ascribed to the external phenomenon,
> or supposed phenomenon; viz. the matter of fact, or
> supposed matter of fact itself. Upon examination,
> this quality, it will be seen, is purely a fictitious
> one, a mere figment of the imagination; and neither
> improbability and impossibility on the one hand, nor
> their opposites, probability and certainty, on the other,
> have any real place in the nature of the things themselves.[68]

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63. See above, p. 61.

64. 7 Works, p 78.

65. Ibid. p 77.

66. Ibid. pp 78-79.

67. Ibid. p 78.

68. Ibid. p 77.

While the subject matter of evidence in a judicial trial is certain, the evidence in a judicial trial which is communicated by signs cannot in the nature of things mirror the object of that evidence.[69] Bentham's theory of fictions and language allowed him to move gradually and systematically from facts to psychological states about those facts; to particular as well as to general and complex psychological facts. His concept of evidence is broad and general extending beyond the directly adduced evidence to general experience.[70] Human experience, individual and general, is relevant to the evaluation of opinions about facts.[71] Probability, and its degrees and modes of expression, constitutes psychological facts about the course of nature.[72] Bentham viewed experience and the course of nature from both an absolute and a relative stand point.[73] It is absolute when viewed in general independently of any mind's knowledge about it. It is relative when an individual conception of the course of nature is taken into consideration. Though Bentham emphasized and stressed the importance of experience in the evaluation of probabilities and the reaching of probability judgments, his abstract and verbal analysis committed him to the most general view of human experience as a source for decision-making. He used it as his inarticulate premiss without relativising it to the problems of evidence in an individual trial setting. These propositions about Bentham's writing on evidence require an elaborate analysis for which I shall construct three hypothetical situations which, I hope, will clearly illustrate the

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69. Id.

70. 7 Works, pp 4, 7, 98, 99.

71. Ibid. p 83.

72. Ibid. pp 77-78.

73. Ibid. pp 84, 91-92.

the kind of issues which are usually raised in a judicial fact

finding situation.   The first situation will be referred to as the

T - situation, the second as the M - situation, and the third as

the N - situation.

2.   A Schematic presentation of Evidence

Let 'F' be an act or action, a state of a thing or a person;

F is an evidentiary fact having either direct or circumstantial

connection with an ultimate fact ('U').   'J' refers to the fact-

finder (judge or jury), and 'W' refers to a witness deposing before

J in relation to F.   'ST*' refers to the possibility of a fact's

existence in general.   'ST' with the subscript of the witness

deposing to it (ie. W_1, ST_1), refers to the time and place (co-existent

or otherwise) connected with the occurence of F, (or its alleged

occurence), as perceived, (or alleged to be perceived), by that witness.

'P' refers to a persuasion, actual or assumed, on the part of W,

which is caused or alleged to be caused by the perception of F at an

ST co-existent or otherwise connected with F, W and P.   'R' refers

to a report or discourse about the co-existence of, or other relation

between, W and F at a specific ST made by that witness to J.   The

impact of R on the mind of (J) when positive shall be designated

by 'B', (when J believes that R);   when negative it will be designated

by 'NB' (i.e.:- when J does not believe that R).

Now let us assume that W_1 really does directly perceive F at

ST_1, so that we can say that at ST_1 W_1 was in a position to determine

whether F, and that he in fact perceived that F, and this is what he

reports.   It follows that W_1 was persuaded that F.   R will entail

that F.   The assumption of the truth of these reports helps J to'

decide that W_1 and ST_1 co-existed or were otherwise related to each

other as R described.   It also helps him to decide further that $W_1 ST_1$

co-existed, or were related to F, and that W_1ST_1F and P co-existed, or were related together as R expresses. In a T-situation R expresses W_1ST_1, W_1ST_1F and W_1ST_1FP.

In an M-situation (mistaken situation) let us assume that W_2 at ST_2 directly perceived E but mistook it for F. He had ST_2FP. R will be W_2ST_2FP. If we assume the ability to look into the mind of W_2 and see what it registers, we can see in that mind W_2ST_2FP. R also expresses the same image, but knowing that E was mistaken for F at ST_2 we know that F did not exist at ST_2. Accordingly P exists in W_2's mind while F does not exist at ST_2. The knowledge of F at ST* contributed to that result.

In an N- situation (non-existent situation)

(i)   Assume W who either was not at ST_3 or at any other place from which he could perceive what occurs at ST_3 made R before J in which he stated W_3ST_3FP, or

(ii) While being at ST_3 and no F took place at ST_3 or any other place from which W could perceive the occurence of F from ST_3 he made an R to J stating W_3ST_3FP. In this situation F is not only untrue it is non-existent at ST_3. P is non-existent at ST_3. There is neither an F nor a P to co-exist with or relate to ST_3. Another F and another P might have been acquired at ST* but not at ST_3. The co-existence or relatedness of ST_3 with F and P is essential for the truth of W_3ST_3FP

This can be explained diagramatically as follows:

Assuming F to be actual, we might then have the following situation:

(I)   [W_1] that F, who reports that F to [J] who   believes the
report,

P (persuaded) at ST (a particular time and   P is genuine
place at which W is in a position
to determine whether F).

F is probative of U   ∴ J's Belief
is correct

(II)   [W_2] that F*, who reports <u>that F</u> to [J] who   believes the
report

P (persuaded) at ST_2 (a particular time and   which does not
place at which W is not in a   correspond to F,
position to determine whether F

F* is not probative of U   ∴ J's Belief is
incorrect

If we assume that there was not a genuine mistake, and that W_3

is testifying to something which he ought not to, we might have

the following situation:

(III) [W_3] that FST* (from general experience) but   believed the
reports FST_3 (a fact he alleges   report, on
to have perceived at the relevant
probative time and place to J who

P(persuaded) at ST* (not the particular relevant   non-existent
time and place where that F can   persuasion on the
be determined.   part of W_3 of the
existence of F at
the relevant time
and place

F at SF* is not probative of U   ∴ J's Belief is
incorrect

diag. (1).

The reason for his testifying in the above way could be:

(i)   He was not in a position (at the appropriate ST) to determine whether F, even if it was indeed the case that F

(ii)   He was in such a situation, but neither perceived that F nor perceived F* as F, nor was in any other way perceived that it was a fact that F.

The three schematic situations, analysed in terms of their ingredients, are meant to provide examples which will aid the discussion of Bentham and other evidentiary scholars, in the hope that their use may be conducive to a better understanding of these scholars, and the views I express in interpreting their writings, or criticizing them.

As we shall see Bentham's analysis concentrates on P as expressed in R, rather than F. In the three situations (I), (II), (III), the only one in which R correctly reports a reliable P and a genuine F is situation I.   In the other situations either F did not exist at the relevant ST, or else it was not reliably perceived to exist, though W thought it was, or there was no perception or persuasion at all.

3. The Evaluation of Bentham's Analysis.

In a judicial trial where J is completely ignorant of the status of F, P and R, (which can be distinct facts) R may correctly report F and P, or mistake F for another fact, or falsely report F and P. J's concerns about F will be (i) to ascertain whether it occurred; (ii) to determine its probative value (a) as expressed in R, and (b) as is. estimated by J independently of R.

Bentham's views on these matter ⟨ are rough and general.[74] His effort was a pioneering effort, for his time, but it has never, as some would suggest, come close to capturing the complexity whether

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74. See G. Postema, op.cit. pp 38,43 and 62.

of direct or circumstantial evidence on the one hand, or on the other hand the further complexity of combining or otherwise making use of the mixed mass of evidence consisting of those items.   Even when his system is viewed as a rough, general, tentative and incomplete system, we shall see that he was not wholly consistent.

According to Bentham all that R (witness' report of F) proves is P (the witness' reported persuasion): R being discourse its immediate object is P not F (the evidentiary fact or fact reported). The immediate object of R of W is the persuasion of W.   R cannot mirror F.[75]   If this is meant to state that in every R there is a true P, which R mirrors, it is not correct as two out of the three situations mentioned above show.   Again since P is a fact distinct from both F and R it is difficult to see how R can mirror P and not F.   The reasons that lead us to question whether it mirrors F, should lead us to question whether it mirrors P.   It is true that P as a psychological fact may lie concealed in W's breast if it exists,[76] but it does not follow that W's discourse about P would in all cases mirror an actual persuasion on his part.   For these reasons P (reported persuasion of the witness) for J ought to be as unknown as F (evidentiary fact) even after R (witness' report) is stated. However, Bentham assumed that if R (witness' report) is believed by J (fact-finder), the P (reported persuasion of the witness), and probably F (evidentiary fact) will also be believed by him.   Before undertaking that task J (fact-finder), according to Bentham, should embark on an inquiry in which R (witness' report) is not necessarily used as evidence, that is J (fact-finder) must inquire into whether or not F (evidentiary fact) is an impossible or incredible fact.[77]

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75. 8 Works, p 329; 7 Works, p 77.

76. 7 Works, p 77.

77. Ibid. pp 76 et seq.

It is important to observe, here, that the inquiry relates to F
(evidentiary fact), not as FST <u>subscript</u> (within a limited individual
spatio-temporal region) but as FST* (existence of its type in general).
In such an inquiry J's "evidence" is the course of nature as understood
by him.

> It has been seen, that in all cases without exception, in
> which any matter of fact is supposed by any person to be
> incredible, the ground of the supposition is a supposed
> disconformity between this matter of fact, and what is by
> the person in question considered to be the established course
> of nature.[78]

J's own knowledge of the course of nature may satisfy him that F is
impossible in its own nature (e.g. witchcraft),[79] or that though
possible in its own nature its existence is 'incompatible' with the
existence of another fact established by 'the testimony of a superior
number of witnesses (e.g. alibi evidence).'[80]   According to Bentham
in the first case the impossibility is established by the repugnancy
of F (evidentiary fact) to the established course of nature.   In
the second case it is established by the inconsistency of F with an
established law of nature.

> In the first case, therefore, the impossibility being
> supposed, we immediately set it down that the testimony
> of the affirming witness is false: in the second place,
> we have to choose which of the two testimonies we shall
> disbelieve - that of the witnesses who affirm the one
> fact, or that of the witnesses who affirm the other
> fact.[81]

As is clearly indicated in the above passage and in Bentham's section
on factors which augment or diminish the probative force of R,[82]
Bentham recognized situations in which R must be disbelieved if
another R is to be believed.[83]   Despite this Bentham seems to maintain

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78. <u>Ibid</u>. p 84.

79. <u>Ibid</u>. p 111.

80. <u>Id</u>.

81. 7 <u>Works</u>, p 112.

82. 6 <u>Works</u>, pp 221-222, 224

the position that any R in any case ought to be credible[84] and entitled

at least when expressed by W to full probative value, or to the value

assigned to it by W when it is direct testimonial evidence.[85]   He

based his assumption of the credibility of testimony (R) on experience

and its uniformity, as established by testimony itself.[86]   The

conformity of general experience to testimony has in its turn established

a general psychological fact in the form of an inclination or propensity

to believe in testimony.[87]   For Bentham such a propensity exists as 'matter

of fact - matter of universal experience ... -'[88]   He also considered

it right to trust in such a propensity, as experience shows it to be

trustworthy, and as utility demands.[89]   Of course he recognized instances

in which lack of conformity is observable.[90]   As a result of this

recognition he stated a general qualified rule which maintained that

testimony is entitled to belief 'failing special and predominant reasons

to the contrary'.[91]   The effect of this assumption is to assign to

any R about an F which is not impossible or incredible in itself the

full force of practical certainty.[92]   The initial impact of such an R

would be B in J's mind.   This is subject to revision based on the moral

character of the witness, which may augment or diminish BJ;   the form

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84. 6 Works, pp 235 et seq.

85. Ibid. p 224.

86. Ibid. p 235.

87. Id.

88. Id.

89. Id.

90. 6 Works, p 236.

91. Id.

92. 6 Works, p 233.

in which R is presented, and its closeness to or remoteness from $\digamma$
(evidentiaryfact), are other factors which may augment or diminish BJ
(fact-finder's belief) as based on WP (witness' reported persuasion)
or WR (witness' report).[93] Even when R is believed by J, because
W is a credible witness, defects in W's perceptive powers may reduce
the BJ (fact-finder's belief) based on WR (witness's report) or WP.
The psychological fact BJ (fact-finder's belief) may relate to (1)
the existence of F or its probability as ST* (possibility of its
existence as a type), or (2) as ST subscript (its existence within
a limited individual spatio-temporal region), or (3) the truth or
probability of WPFST (reported persuasion alleged to be induced by the
existence of a fact at a particular time and place) subscript, or
(4) the impact of the proving force of F (evidentiary fact), P
(reported persuasion), or R (witness' report) on J as to the truth
of U (ultimate fact in issue) assuming F, P, or R, is true, (5)
that BJ (fact-finder's belief) is a function of all four matters
mentioned in (1), (2), (3) and (4). According to (5) J must inquire
into the truth status of the source of his B (belief) before considering
its probative force in (4). This means that in relation to any
single item, whether that item be of direct or circumstantial evidence,
J must perform at least two functions. His task becomes more complex
when he performs comparative judgments involving more than one item.
A logical consequence of (5) is that the real status of F, P, or R,
as the case may be, must be ascertained by J and it should not be
assumed.

One difficulty about Bentham's assumption of the reliability
of testimony is that each testimony is at the start entitled to full
practical certainty. One consequence of this is that BJ has dominance

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93. Ibid. p 224.

over NBJ.   Another more serious consequence is that an R or P about

an F is given full practical certainty, or the degree of certainty

assigned to it by the witness deposing to it, while the same amount of

certainty or degree could be given to the contradictory of F (this fact

or reports about it).   His process of revision on special and

predominant reasons may or may not eliminate the contradicition

altogether.   Bentham does not seem to apply his mind to this question.

However, he maintained a general position in which he implicitly

accepted the possibility of J acquiring both B and NB as to evidentiary

facts in proof of U, and evidentiary facts in disproof of it

respectively.   This position was maintained by Bentham throughout

his discussion of probative force.   The following passage however is

of direct relevance to the present point.

> Suppose that - instead of operating all on one and the
> same side, viz. in proof of the fact in question the
> respective testimonies of a number of witnesses, all of
> the same level, are divided, some operating in proof of the
> fact, others in disproof of it: in this case, the mode
> of measuring the probative force will be nearly as simple,
> and altogether as certain, as in the former.   In the
> former, it was the sum of the testimonies that was taken;
> in this, the difference.[94]

Accordingly if party Y alleges U and called witnesses in proof

of it while party X alleges not U and calls witnesses in disproof of

it J could believe both Y's witnesses and X's witnesses though the

one set may contradict the other set.   For Bentham this conflict is

resolvable either by the number of the witnesses, or when their degree

of persuasion is quantifiable, by the difference in the strength.[95]

This position both obscures and calls in question the significance of

the role of J in deciding between B and NB in the case of a single

item of evidence, whether direct or circumstantial;   and its role in

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94. Ibid. p 221.

95. Ibid. p 233.

the comparative judgment between belief for F and belief in not F.

It also poses a question as to whether or not he provided any methods

or procedure for carrying out such comparative judgments, and if he

did provide such a prcedure whether it is eliminative or combinatory.

For example if (1) above is observed by J with regard to the evidentiary

facts, an item of evidence will not be considered as true or sufficiently

probable to afford a probable inference to a principle or ultimate fact

except when the judge inquires into and ascertains the truth or

probability of that item.   This would suggest that certain evidentiary

items would be disbelieved and eliminated by J (the trier of facts)

while others would be believed and then, and only then, their probative

force will be determined in relation to a principle fact or an ultimate

fact in issue.   In such a case the method or procedure is bound to

be an eliminative procedure or method with regard to single items of

evidence.   According to this method when two evidentiary facts are

contradictory they cannot both be true or probable, one of them must

be eliminated.   It is of course possible to argue that while such an

eliminative process may attribute a high degree of certainty to the

testimony it does not eliminate, nevertheless, it only affords a

judgment of probability, which by definition must fall short of

certainty.   According to this argument whenever a fact is probable,

its negation or contradictory must have some sort of probability

however slight the degree of that probability may be.   While the

probability of an evidentiary fact is different from its probative

force, both the positive and negative degrees of that probability

must be taken into consideration as ingredients in the evaluation or

calculation of the probative force of the evidentiary fact in proving

the principle or ultimate fact as the case may be.   Such a combinatory

procedure would attract a Pascalian or Bayesian method.   It is clear

now that the inquiry into and the ascertainment of the truth or

probability of an evidentiary fact, though distinct from the gradation

of the probative force of that fact in proving or disproving a principle

or ultimate fact, is essential for either method of gradation. For

both the Baconian and the Pascalian a task of great complexity must be

performed by J. As we have seen Bentham has not considered such a

task nor analysed its complex ingredients. It can be assumed, therefore,

that Bentham, as far as this point is concerned, was concerned with the

degree of sufficiency of an evidentiary fact after assuming its truth

or probability. It may be argued that since Bentham's concern is with

P or R as psychological facts, and not with F or not-F, no conflict

exists when FST_1 is stated by W_1 and FST_2 (its contradictory) is stated

by W_2 (a witness of the existence of a fact at a particular time and

place) as FST_2. Bentham's theory of fictions may be cited in support

of this argument. Such a view is not tenable as far as his position

with regard to alibi evidence is concerned. His theory of fictions as

we have already seen transforms the inquiry into the reliability of P

(the witness' persuasion) or the truth of his report, to an inquiry into

the real existence of F subscript (the existence of that type of fact

at any other time and place). The argument that Bentham was not

concerned with the truth or probability of facts has support in

his ordinary standard of the sufficiency of evidence. The relevance

of that standard for the present purposes is that it was meant to be

a standard to criticise and evaluate J's final determination as to U

(the ultimate fact in issue), which means that what is evaluated is

the achieved cognition of J (the fact finder) and not the process whereby

he reaches that judgment. Secondly, the standard was a standard of

sufficiency of a single item of direct evidence:

> To form for the purpose of discourse, a nominal standard
> of comparison; let us take a mass or lot of evidence,
> of such a description, as, in the judgment of the ordinary
> run of mankind, is found sufficient (if not contradicted
> or otherwise counter-evidenced,) to produce a belief of

> the existence of the matter of fact which it asserts:
> and this mass of evidence, let it be the deposition of
> an individual taken by lot, and unknown to the judge;
> the witness who thus deposes asserting, that, in the
> situation of percipient witness, the matter of fact
> presented itself, under the circumstances stated by him,
> to the cognizance of his senses.[96]

This argument has further support in the fact that Bentham's argument

for the desirability of the quantification of the strength of probative

force was based on the possibility of the existence of two sets of

contradictory testimonies on both sides of the issue.   It is because

of his recognition of that possibility that he was able to see

probative force as an infinite force, and the scale of its measurement

as an infinite scale.[97]   When the possibility of ideal types of

testimony on each side of the scale can be assumed, and the possibility

of additions on each side is possible, then because of these assumptions,

the upper limit of the scale can be an infinite limit.   He states that

as follows:

> [A]n infinite scale (it has been already intimated) is the
> only sort of scale by which the truth of the case can be
> expressed.   For what can that mass of evidence be, to the
> probative force of which no addition is made by the addition
> of a mass of evidence, exactly of the same composition in
> every respect, and twice as great?[98]

According to Bentham the resolution of such conflict by reference to

the number of witnesses would result in deception in many cases,

because persuasion exists in different degrees;   that the orthodox

mode of expressing the quality of probative force by a witness or

a judge is not accurate.   Their deplorably defective modes are :

'I know - I believe - the fact happened so and so - I believe it

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96. Ibid. p 220.

97. Ibid. p 232.

98. Id.

happened so and so: and there the gradation ends.'.[99] According

to Bentham this mode of expression gives testimony a degree of effect

greater than its actual strength in the mind of the witness.[100]

Bentham believed that the only adequate mode of expressing degrees

of persuasion is by numbers.[101] He saw in the practice of wager and

insurance a parallel which though in exact course its scale is finite,

is harmless since '[h]appily, incorrect as it is, its incorrectness

will not be found attended with any practical inconvenience; since,

on each occasion, whatever degree of correctness can on that occasion

be of any use, can always be attained.'.[102] For this purpose Bentham

advanced his thermometer of persuasion;[103] a scale for measurement

of probative force. It has a positive and a negative side. The

positive part was meant to be used for the expression of the degrees

of persuasion affirming the existence of a fact. The negative part

for expressing degrees of persuasion disaffirming or denying the

existence of the same fact. The positive part consists of degrees

from zero to ten. The negative part consists of degrees from zero

to minus ten. The intensity of persuasion in favour of the existence

of the fact can be calculated by adding the different expressions of

probative force on the positive side of the scale. The total sum of

the degrees of persuasion on the negative side of the scale represent

the total calculated intensity of persuasion disaffirming or denying

the existence of the same fact. The result of subtracting the total

of the negative side from the total of the positive side determines

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99. 6 <u>Works</u>, p 224.

100. <u>Ibid</u>. pp 229; see also <u>Ibid</u>. 232.

101. <u>Ibid</u>. pp 229, 224-225, 232-233.

102. <u>Ibid</u>. p 224.

103. <u>Ibid</u>. p 225.

whether the fact is proved or disproved.[104]

The same scale can also be used by the judge in measuring and expressing his revised estimation of the probative force of the expressed degree of persuasion of the witness. While Bentham emphasized the feasibility of the use of the scale in principle he made some reservations about its application in practice.[105] He also pointed out the limited use to which it can be put when he stated

> The use, and only use, of the sort of scale in question, would be to enable the witness to give to his testimony, or the judge to his opinion, a less degree of effect in practice than what it is productive of without the employment of any such scale.[106]

Bentham's scale was criticised by almost all his commentators and critics. Some of them according to Professor William Twining are 'So dismissive.... that their grounds for dismissal are not always clear.'[107] The gist of criticism was summarized by Professor Twining in the following passage.

> Bentham's proposal received a torrid reception at the hands of almost all commentators. One of the editors of Best on Evidence J. M. Lely, went so far as to cut out Best's Critique on the grounds that this 'fantastic suggestion' was 'one of the few follies of a very wise man' .... Dumont whose criticisms were adopted by several commentators (despite Mill's attempted rebuttal), was careful to base his objections on grounds of feasibility rather than principle. Apart from his rejection of the wagering analogy, mentioned above, he doubted whether accuracy and comparability would be feasible in practice and he argued that 'the authority of the testimony would vary inversely as the wisdom of the witness,' for the

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104. Id.

105. 6 Works, p 226 also p 232.

106. Ibid. p 232.

107. Ibid. p 234.

> reserved would understate the strength of their belief, while passionate men would overstate it.[108]

According to Professor William Twining 'We need not here concern ourselves unduly' with these arguments about practical feasibility, which involve no rejection of the scale in principle, or point out any positive harm it may do.   However it seems that the following argument involves more than an objection about feasibility.[109]

> A witness who says, 'I am doubtful,' says nothing at all, insofar as the judge is concerned.   It serves no purpose, I think, to inquire after the degrees of doubt.   But these different states of belief, which, in my opinion, it is difficult to express in numbers, display themselves to the eyes of the judge by other signs.   The readiness of the witness, the distinctness and certainty of his answers, the agreement of all the circumstances of his story with each other, - it is this which shows the confidence of the witness in himself.   Hesitation, a painful searching for the details, successive connexions of his own testimony, - it is this which announces a witness who is not at the maximum of certainty.[110]

This argument by Dumont seems to object in principle to the applicability of the scale to the doubting witness.   This is especially so in the case of direct testimonial evidence where F is a reported perception by W of the occurence of U.   In such a situation the probability of F and its probative force to prove U are almost identical.   A witness who admits the obscurity or indistinctness of his perception of U excludes his testimony by that admission.   If this objection is valid then the scale will only apply to confident testimony about a direct or circumstantial fact.   Since the degree of probative force of an item of circumstantial evidence according to Bentham is estimated by the judge and not the witness introducing it,[111] this leaves only

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108.   See W Twining, Bentham on Evidence, op.cit. p 64   E.

109.   Ibid. p 64   F.

110.   See 6 Works, p 234.

111.   Ibid. p 224 and 7 Works, pp 64-65.

direct testimonial evidence for the witness to express his degree of persuasion about which must be ten (because he is confident). But we have already seen that by the assumption of the credibility of testimony J is bound to give that testimony full practical certainty which is also ten. This renders the scale as far as the witness is concerned otiose. Its use in this way by the judge will be criticized later. We shall now proceed to consider the probative force of circumstantial evidence and how it is measured.

E. The Probative Force of Circumstantial Evidence.

Unlike the case of direct testimonial evidence the truth or probability of an item of circumstantial evidence is distinct from its probative force. An item of circumstantial evidence by definition does not prove a perception by W of U, but a perception of another F, which even when proved to exist or not to exist does not conclusively establish the truth of U. Bentham's concern was with the probative force of a circumstantial F (its strength and sufficiency), and not with the existence or probability of F. Bentham assumed the circumstantial evidentiary facts to be genuine or probable.[112] The examples he gave in illustration of them such as, e.g., the possession of the stolen article by the suspect, are examples of circumstantial facts whose genuineness had already been established.[113] This also seems to be the reason why they should receive the full measure of practical certainty from J. However, this should not be understood as stating that Bentham treated every received item of circumstantial evidence to be an affirmative item. According to this view an affirmative item of circumstantial evidence is an item the

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112. See 7 Works, pp 5-52.

113. Ibid. pp 11 et seq.

genuineness of which has already been established by J. It
follows from this that there are unaffirmed facts which Bentham
did not consider, (a matter which may be regarded as belonging to
the psychological process of deciding.).

The probative force of an affirmative fact in relation to
a principle or ultimate fact is liable to be infirmed or explained
away by the existence of other facts which Bentham termed the
infirmative facts or infirmative suppositions.[114] The existence
or absence of infirmative facts in respect of an affirmative
supposition is a real measure of the probative force and conclusive-
ness of that affirmative supposition.[115] This is so because the
affirmative fact may exist in a number of situations one of which is
the situation involving the act of delinquency in question.[116]
For this reason the existence of any of these situations other than
the situation involving delinquency will tend to infirm or otherwise
explain away the probative force of the affirmative fact.[117] For
example if X was tried for the theft of a watch which was found in his
possession after it had been stolen, then, the fact of possession is
the affirmative supposition to which any number of possible facts may
be infirmative suppositions, e.g. the fact that the watch was bought
in the market overt or that it was given as a birthday present.
When J asserts an affirmative supposition he must look out for
infirmative suppositions.[118] If he cannot discern such an infirma-
tive supposition, the initial practical certainty of the affirmative

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114. Ibid. pp 4-5.

115. Ibid. p 64.

116. Ibid. p 5.

117. Ibid. p 64.

118. Id.

fact remains.[119]   If he discerns one, or more than one infirmative

suppositions to the same fact, then he must estimate the probative

force of the infirmative suppositions and deduct the estimated

probative force of the infirmative supposition or suppositions as

the case may be from the ratio expressive of practical certainty of

the affirmative fact, the remainder will be the net probative force.[120]

Bentham did not raise a number of questions pertaining to the

estimation of infirmative suppositions in relation to affirmative

suppositions both as single and mixed items.   He failed also to raise

similar questions concerning the problems which the difference between

direct and circumstantial evidence may pose in respect of the

estimation of single items of each, or the combination of the estimated

single items.   For instance, is the same scale applicable to both

affirmative and infirmative suppositions?   If it is, does this mean

that all circumstantial facts, both affirmative and infirmative, have

the same level of probative force?   Assuming the scale applies to

both, how much probative force is sufficient after the deduction of

the estimated probative force of the infirmative supposition from that

of the affirmative suppositions?   Again as far as the relationship

between direct and circumstantial evidence goes, it may be asked how

does a ten awarded to motive compare with the ten or five awarded to

alibi evidence in relation to the same matter?   What is the standard

required to prove a single item whether of direct or circumstantial

evidence after the revision of B takes place?   What is the standard

of judgment for the case as a whole?

The fact that Bentham failed to raise any of these questions

is sufficient evidence to show that his system did not measure up to

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119. 7 Works. p 65.

120. Id.

the complexity of the task of judicial fact finding, either at the level of the single items, or their combination, or dealing with them in any other manner as a total mass of mixed evidence. For this reason attempts to read his infirmative suppositions as providing a method or procedure for decision may be criticised for 'reading too much into what is best seen as a penetrating, but not very developed, pioneering effort.'[121]

F. Bentham and the current Probability Debate

The current probability debate between the Baconians and the Pascalian (including the Bayesian) has, *inter alia*, revived interest in the study of leading evidence theorists like Bentham and Wigmore in general and within the context of that debate. One of the present interests of Bentham scholars is to pose, and to try to answer, the question whether Bentham's system of analysis of fact finding reveals a Pascalian or a Baconian kinship.[122] Implicit in this is the awareness that Bentham's system is rough, incomplete and insufficiently complex for the requirements of both Baconians and Pascalians.[123] However his writings contain crude forms of both methods and probably, a non - Pascalian - Baconian method i.e. a holistic method as I shall argue. Jonathan Cohen who has recently developed a version of Baconian inductive probability thought that Bentham's rejection of the doctrine of chances, and his failure to make out an alternative structure, was inconsistent with his acceptance of wagering practice because, in the words of Cohen, 'it can be shown that fair betting odds within a suitably coherent system of wagers constitute a measure that conforms to the axioms

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121. See W. Twining, Bentham on Evidence, p 59.

122. See G. Postema, op.cit. pp 38, 43 and 62; W. Twining, Bentham on Evidence, op.cit, pp 59-64 F; L. J. Cohen, The Probable and the Provable, op.cit. pp 54-55.

of mathematical probability [124] ...' Cohen's arguments would, perhaps,

be valid had Bentham used the analogy with wagering as a basis for a

method of decision. However, according to Professor William Twining

Bentham, 'is only using the analogy in connection with finding a

terminology for expressing degrees of persuasion; he does not follow

the path that leads some subjectivists to use the analogy with wagering

as a basis for a procedure for decision...'[125]

I agree with Professor Twining's views that Bentham did use

wagering as a basis for a method for reaching a decision. However,

Professor Gerald Postema seems to be inclined to regard Bentham as

providing a method or procedure for decision, especially in relation

to the role of infirmative suppositions.[126]

> [T]he model of rational assessment of probability and
> probative force which Bentham sketches, though
> admittedly rough and undefended, bears a certain
> kinship relation to the recently revived Baconian
> conception of probability. The method of 'infirmative
> suppositions' is at least Baconian in spirit. It is
> designed to assess the strength of inferences from
> a body of particular facts to another particular
> fact, all against the background of already established
> or accepted (though defeasible) causal generalizations.[127]

The opinion of Professor Postema was expressed in an article

in which his analysis was based exclusively on circumstantial evidence.

As I have already explained Bentham used infirmative suppositions to

ascertain the probative force of a single item of circumstantial

evidence (i.e. the affirmative fact which the infirmative suppositions

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124. See Jonathan Cohen, The Probable and the Provable, pp 54, 55.

125. W. Twining, Bentham on Evidence, p 64 D.

126. A view similar to that of G. Postema was expressed by William Twining
in his draft of Bentham on Evidence. However, I brought this criticism
to his notice and I learnt that he adjusted his text accordingly, see
Bentham on Evidence, op.cit.

127. G. Postema, op.cit. p 62.

infirm). He did not use it as a decision procedure in a complex case involving more than one affirmative supposition, or a number of affirmative suppositions in conjunction with direct testimonial evidence. To argue that his infirmative suppositions provide a method is to argue that he was ready to apply that method to both the evaluation of direct and circumstantial evidence as single items, and to the combination which involves addition on each side and subtraction of the total of the negative side of the scale from that of its positive side. But we have already seen that the scale, or the scales of measurement are bound to give the same value (numerical value) for facts whose probative force in relation to U is not the same (e.g. alibi and motive). This view would not appeal to Bentham who had no doubt about the lack of uniformity of probative force in direct and circumstantial evidence. Though he used addition and subtraction in the case of single items of both direct and circumstantial evidence, the fact that he did not relate, for the purpose of combination, different items of circumstantial evidence, or direct and circumstantial evidence, may suggest that he did not have in mind a method for the case as a whole. To suggest that he advanced infirmative supposition as a method amounts to committing him to a system which omits most of the ingredients of the single items (e.g. the probability of evidentiary facts), or assumes them to be true, and then estimates those items in isolation from other items without regard to the complexity in which they should be seen. It would not be Baconian in spirit because it is not eliminative. It is combinatory in a crude way. Some of its assumptions, (such as the cascaded nature of circumstantial evidence, the subjective estimates of probative force by witnesses and judges as a basis for further numerical quantification, and the revision of opinion that follows the instinctive nature of inference), are similar to the assumption on which Professor David

Schum has recently used a modified version of Bayesian theory in conjunction with other theories to decompose the probabilistic ingredients of each single item of evidence and calculate its probative force, and then combine the different calculated ingredients into a single calculation for the probability of the case as a whole.[128]   One vital difference between Bentham and Professor Schum is that while Bentham's analysis starts at the level of true facts to the exclusion of unasserted or unaffirmed facts, Professor Schum, as we shall see, takes in all relevant facts for his calculations.

If Bentham's Rationale on Judicial Evidence does not commit him to a method for the case as a whole, or commits him to a vague one, his logic, which was probably written after the Rationale, may be related to what I shall term the 'holistic method'.   His concept of facts and his archetypal images indicate the possibility of such a method.   Since the holistic method will be developed and discussed in a separate chapter I will refer to this point and expand it in that chapter.

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128.   As to Schum see above, ch. 1, n. 51.

CHAPTER THREE

Sir James Fitzjames Stephen
and John Henry Wigmore

A.   Introductory Remarks

One of Stephen's well known contributions is his attempt to

provide an underlying explanatory principle to the law of evidence

through the theory of relevance.[1]   However since the present study

is not directly concerned with 'evidence' as a system of rules I

shall, here, deal mainly with another of Stephen's concerns;

namely his attempt to treat judicial inquiries analogously to

scientific ones.   Stephen's concern about the inferential nature

of judicial proof and his discussion of its inferential structures

was also shared by Wigmore.   That common concern is the reason

why they are dealt with together in this chapter.

B.   Stephen

1.   Application of Scientific Methods of Inquiry to Judicial
         Inquiries.

Stephen's main object in his theory of judicial proof as

expressed in his Introduction to the Indian Evidence Act, 1872,[2]

was to present judicial fact finding as a scientific inquiry to which

Mill's logic of scientific discovery could be applied.[3]   As we shall

see his limited objectives and the constraints of the methods which

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1. For criticism of his theory see, Thayer, A Preliminary Treatise on
Evidence at the Common Law (1898), pp 266 et seq; W. Twining 'The
Rationalist Tradition of Evidence Scholarship' in E. Campbell and L.
Waller, (eds.), Well and Truly Tried (1982), p 211 at 234 and Wigmore on
proof (forthcoming); For a biographical account of Stephen see,
Radzinowicz, Sir James Fitzjames Stephen (1957); Simpson, Biographical
Dictionary of the Common Law; Twining 'The Rationalist Tradition',
op.cit. at p 234.

2. Hereafter cited as IIEA.

3. Ibid. ch. 2, esp. pp 18 et seq.

he intended to apply to the judicial fact-finding made his theory
of judicial proof a very narrow and limited one. He did not concern
himself with the ascertainment or investigation of the genuineness
of evidentiary facts. Instead, he dealt with what inferences could
be drawn from facts which are believed to exist. His starting
point was an accepted fact, and his concern was with the inference
which that fact affords.[4] For this reason it is not necessary to
inquire into Stephen's intellectual sources beyond his reference to
Mill's methods of scientific discovery.

Sir James Stephen declared that '[t]he law of evidence is
nothing unless it is founded upon a rational conception of the manner
in which truth as to all matters of fact whatever ought to be
investigated.'.[5] The facts about which Stephen was concerned were
facts in issue. He defined the facts in issue with reference to
substantive law. They are the facts which 'may by themselves, or
in connection with other facts, constitute such a state of things
that the existence of the disputed right or liability would be a
legal inference from them.'.[6] The existence of the facts in issue
can only be ascertained from the existence of other facts which
'may affect the probability of the existence of facts in issue,
and be used as the foundation of inferences respecting them...'[7]
Stephen termed these facts relevant facts.[8] He used the
relationship of cause and effect between the fact in issue and the

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4. *Ibid.* p 10.

5. *Ibid.* preface

6. *Ibid.* p 9.

7. *Ibid.* pp 9-10.

8. *Ibid.* p 10.

relevant fact as the mark of his definition of relevant facts.

A fact is relevant to another fact if it stands to it in the

relation of cause or effect; on the assumption that a theory,

according to which the alleged fact is the cause or effect of the

fact in issue, is true.[9] He used the types of relations recurring

in judicial litigation as the basis of his definition of relevant

facts in sections 6 to 11.[10] While his concept of relevance

indicates what facts may be received by a court, relevant evidence

which affords an inference according to Stephen is the evidence

believed by the court '[w]hether an alleged fact is a fact in issue

or a relevant fact, the court can draw no inference from its

existence till it believes it to exist ...'[11] The psychological

state of the judge in believing or not believing a fact is a

subjective matter according to Stephen: '[j]udges must deal with it

as well as they can by the use of their natural faculties and acquired

experience, and the miscarriages of justice in which they will be

involved by reason of it must be set down to the imperfections of

our means of arriving at truth.'[12]

According to Stephen neither the rules of evidence nor those

of probability are meant to enable the judges to perform that task.

The only guidance a judge may get is from his own experience.[13]

When relevant evidence is admitted and believed by the judge

to exist a further question arises: 'are the known facts inconsistent

with any other than the conclusion suggested'.[14] According to

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9.   Ibid. p 52.

10.   Ibid. p 55.

11.   Ibid. p 10.

12.   Ibid. p 41.

13.   Ibid. pp 41-2.

14.   Ibid. p 38.

Stephen the known facts are 'the evidence in the narrower sense
of the word';they are the facts which are presented to the judge
from which '[h]is task is to infer... the existence of facts which
he neither sees nor hears.'.[15]

By making this assumption about believing the facts to
exist Stephen reduced his theory of judicial proof to inference
from existing facts.   It is a theory about the sufficiency of
evidence not its truth, and about circumstantial evidence not
direct evidence.   This assumption also enabled him to consider
the application of methods of scientific discovery to judicial
inference:[16]

> Inquiries into matters of fact, of whatever kind and
> with whatever object, are, in all cases whatever,
> inquiries from the known to the unknown, from our
> present perceptions or our present recollection (which
> is in itself a present perception) of past perceptions,
> to what we might perceive, or might have perceived,
> if we now were, or formerly had been, or hereafter
> should be, favourably situated for that purpose.
> They proceed upon the supposition that there is a
> general uniformity both in natural events and in
> human conduct; that all events are connected together
> as cause and effect; and that the process of applying
> this principle to particular cases, and of specifying
> the manner in which it works, though a difficult and
> delicate operation, can be performed.[17]

According to Stephen the knowledge of or belief in an
evidentiary fact is essential for the application of Mills' logic
of scientific discovery as he based it on the assumption of the
uniformity of a fixed order in nature. [18]   According to Stephen

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15. Ibid. p 39.

16. Ibid. pp 13-14.

17. Ibid. p 25.

18. Ibid. p 18.

this uniformity can be discovered in general propositions about facts and not by the mere observation of facts.[19]   Their arrangement and comparison according to Mill's inductive methods is essential.

> Generally speaking, this problem is solved by comparing
> together different groups of facts resembling each
> other in some particulars, and differing in others, and
> the different inductive methods described by Mr. Mill
> are in reality no more than rules for arranging these
> comparisons.   The methods which he enumerates are five,
> but the three last are little more than special
> applications of the other two, the method of agreement
> and the method of difference.   Indeed the method of
> agreement is inconclusive, unless it is applied upon
> such a scale as to make it equivalent to the method
> of difference.[20]

These methods are meant to enable the inquirer to find out the true causes of events by eliminating all but one of the possible causes, and so it is by elimination that one establishes the real cause or causes.   The methods of agreement and difference for example are employed by examining the group of events which precede an effect;   if some are found to vary and one or more are found to be constant then the constant cause 'is probably the true cause, and the strength of this probability is measured by the persistency with which the one possible cause recurs, and the extent to which the other possible causes vary.'[21]

The usefulness of this method depends mainly on the powers and means of the investigators to control the operations of the different events in the group, in order to trace their relation to the effect.   This is possible in most physical inquiries, and its

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19.   Ibid. p 19.

20.   Ibid. pp 19-20.

21.   Ibid. p 20.

utility is due mainly to that facility and the susceptibility of the subject matter of inquiry to observation and controlled experiments which yield visible results. In judicial inquiry, on the other hand, both the nature of the subject and the methods employed, are not conducive to such results. The same thing can be said about the method of difference. That method requires an experiment in which a set of events is made to produce an effect, and then by experiment and variation of the same events in relation to the same effect, those which co-exist without producing the effects are mere possible causes, while the one which is absent from such a co-existent set is the true cause. The rule itself is as follows

> If the effect occurs when a particular set of possible
> causes precedes its occurence, and does not occur when
> the same set of possible causes co-exist, one only being
> absent, the possible cause which was present when the
> effect was produced, and was absent when it was not
> produced, is a true cause of the effect.[22]

The dependence of this method on the availability of both effect and possible causes and the true cause for experimentation, both before the effect and after the effect, shows clearly its limitation as a method of constructing generalisations about human conduct. Stephen himself recognised this when he stated

> In inquiries into isolated events this great resource
> is not available. Where the object is to decide what
> happened on a particular occasion, we can hardly ever
> draw inferences of any value from what happened on
> similar occasions, because the groups of events which
> form the subject of historical or judicial inquiry are so
> intricate that it can scarcely ever be assumed that they
> will repeat, or that they have repeated themselves.
> If we wish to know what happened two thousand years
> ago, when specific quantities of oxygen and hydrogen
> were combined, under given circumstances, we can obtain
> complete certainty by repeating the experiment; but

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22. See J. S. Mill, A System of Inductive Logic, (1896) bk. III, ch. 8.

> the whole course of human history must recur before
> we could witness a second assassination of Julius
> Ceasar.[23]

While recognizing the difference in nature, quality, objects, and

methods between scientific and judicial inquiries, and the

inferiority of judicial inquiries as compared with scientific

inquiries,[24] Stephen stated that

> [T]hough the judge and the historian can derive no light
> from experiments; though, in a word, their apparatus
> for ascertaining the truth is far inferior to that of
> which physical inquiries dispose, the task which they
> have to perform is proportionally easier and less
> ambitious.   It is attended, moreover, by some special
> facilities which are great helps in performing it
> satisfactorily.[25]

The task of the judge is easier and less ambitious than that of

the scientist because unlike the scientist the judge is not called

upon to establish general propositions about human conduct through

experiment.[26] They are already established in and by human

experience as approximate rules which are warranted by each man's

experience and confirmed by the experience of others.[27] The judge

in this sense is supposed to know the general propositions and their

qualifications from his own personal experience. This circumstance

according to Stephen renders the task of the judicial fact-finder

easier than that of the scientist because

> To these considerations it must be added that to inquire
> whether an isolated fact exists, is a far simpler problem
> than to ascertain and prove the rule according to which
> facts of a given class happen. The inquiry falls
> within a smaller compass. The process is generally

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23.   See IIEA, pp 26-27.

24.   Ibid. pp 25-30

25.   Ibid. p 30.

26.   Ibid. p 17.

27.   Ibid. p 31.

> deductive.   The deductions depend upon previous
> inductions, of which the truth is generally
> recognized, and which (at least in judicial inquiries)
> generally share in the advantage just noticed of
> appealing directly to the personal experience and
> sympathy of the judge.   The deductions, too, are,
> as a rule, of various kinds and so cross and check
> each other, and thus supply each other's deficiencies.[28]

In this regard an evidentiary fact can be seen as an inferential

warrant for the application of a general proposition or any of

its qualifications as the case may be.   To perform that function

the evidentiary fact 'must either be proved, or be so probable

under the circumstances of the case that it may be presumed without

proof.[29]   According to this requirement a fact which warrants

an inference must, if it is not judicially noticed, be strictly

proved.   By stipulating this condition of strict proof as a pre-

requisite for the application of the inferential process, Stephen

avoided the treatment of most of the problems of judicial proof

which relate to the credibility of witnesses, the task of the fact

finder in relation to the evaluation of evidence and the combination

of its different items, and the process problems of a judicial

fact finding situation in general.   Though Stephen's theory is

extremely narrow and general its affinity with the recently developed

Baconian inductive probability by Jonathan Cohen is not difficult

to discern.   His inference rules as inductively supported qualified

general propositions and his emphasis on experience rather than

'probability' as the only guide for the fact-finder renders that

affinity a very close one.   We have already considered his views

on inference-rules.   As regards probability Stephen has this to

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28. Ibid. p 32.

29. Ibid. p 54.

say:

> The highest probability at which a court of justice can
> under ordinary circumstances arrive is the probability
> that a witness or a set of witnesses affirming the
> existence of a fact which they say they perceived by
> their own senses, and upon which they could not be
> mistaken, tell the truth. It is difficult to measure
> the value of such a probability against those which
> the theories of physical inquiries produce, nor would
> it serve any practical purpose to attempt to do so.[30]

The same opinion was expressed more forcefully in relation to the

standard of proof.   According to him proof beyond reasonable

doubt:

> [M]eans nothing more than that in most cases the
> punishment of an innocent man is a great evil, and
> ought to be carefully avoided; but that, on the other
> hand, it is often impossible to eliminate an appreciable
> though undefinable degree of uncertainty from the
> decision that a man is guilty. The danger of
> punishing the innocent is marked by the use of the
> expression 'no doubt,' the necessity of running some
> degree of risk of doing so in certain cases is
> intimated by the word 'reasonable'. The question,
> what sort of doubt is 'reasonable' in criminal cases
> is a question of prudence.[31]

Stephen's theory of evidence also provides a useful back-

ground for the discussion of the extensive and broader treatment

by Wigmore of the inferential nature of judicial evidence in his

Science of Judicial Proof.   To that treatment we shall now turn.

C.   John Henry Wigmore

1.   The Science of Judicial Proof: Most legal scholars in the

Anglo-American evidence tradition treated the problems of proof as

part of the study of the rules and principles of evidence.   Wigmore

did this in his Treatise on the Anglo-American System of Evidence

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30. Ibid. p 35.

31. Ibid. p 36.

in Trials at Common Law.[32]   However his conviction concerning the

importance of the subject, and its independence of the rules of

admissibility, led him to treat judicial proof in a separate book, The

Principles (later science) of judicial proof as founded on logic,

psychology and general experience.[33]   He expressly stated his effort

to be a tentative attempt at a science the 'chief service it aims to

fulfill is to emphasize the subject as a science, and to stimulate

its professional study.'.[34]   By the time Wigmore wrote his

science the intellectual mainstream of the rationalist tradition

has already crystallized in the form of assumptions and attitudes

forming part of the tradition itself.[35]   As a leading figure of

that tradition, Wigmore attempted to apply the scientific methods

of analysis and synthesis to evidence.   His effort, which interested

a handful of scholars, [36] remained otherwise isolated until the recent

probability debates have awakened further interest in the subject

matter of the Science and its aims.   As a matter of fact the most

sophisticated, detailed and consistent atomistic analysis which has

so far emerged has for its foundations and its starting points

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32.   (1904-1940), see Tillers (rev.), vol. 1A (1983);   see W. Twining
Wigmore on proof, op.cit, 'The Rationalist Tradition' op.cit. p 240;
for a biographical account of Wigmore see Simpson, op.cit;   W. Roalfe,
John Henry Wigmore: Scholar and Reformer, (1977).

33.   (1913-1937).

34.   Ibid. p 5-6.

35.   See Twining 'The Rationalist tradition' op.cit. pp 244 et seq.

36.   W. Twining has been using Wigmore's analysis and charting for
teaching his students in the UK. and USA;   see Twining and Anderson,
Analysis of Evidence, (forthcoming).

Wigmore's <u>Science of Judicial Proof.</u>[37]   Judging by this alone, his

present leading role as a theorist can still be recognized.   In

the words of Professor Twining

> Wigmore claimed that his was the first attempt in English
> since Bentham to deal with the principles of proof 'as
> a whole and as a system'.   This was true when he wrote
> it and it is still true today.   There has been valuable
> theoretical work by Gulson, Michael and Adler, Jonathan
> Cohen and others, but none of these has set out to
> produce comprehensive theories.   Thus Bentham and Wigmore
> are still our two leading theorists of evidence.[38]

The aim of Wigmore was to study and analyse the persuasive

effect of evidence in judicial trials.   One of his remarkable

contributions is his treatment of the effect of evidence on the

mind of the judge in relation to the complexity of a judicial task,

its process and contentious nature.[39]   His realization of the

complexity of a judicial trial and the need for a method to aid

the fact finder to analyse a mixed mass of evidence in order to

assess it as a whole was frustrated by his awareness, at the time,

of the failure of philosophy, logic, psychology, and jurisprudence

to provide such a method

> Nobody seems yet to have ventured to offer a method, -
> neither the logicians (strange to say), nor the
> psychologists, nor the jurists, nor the advocates.
> The logicians have furnished us in plenty with
> canons of reasoning for specific single inferences;
> but for a total mass of contentious evidence in judicial
> trials, they have offered no system.   What is here
> put forward is a mere provisional attempt at method.
> One must have a working scheme.   What is wanted is
> simple enough in purpose, - namely, some method which
> will enable us to lift into consciousness and to state
> in words the <u>reasons why a total mass of evidence does or
> should persuade us to a given conclusion</u>...If we can
> set down and work out a mathematical equation, why can
> we not set down and work out a mental probative
> equation?[40]

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37. See Schum <u>et al</u>, above ch.1, n. 51.

38. 'The Rationalist Tradition' <u>op.cit.</u> p 242.

39. Wigmore, <u>The Science of judicial proof</u>, ch. 2.

Reading this and other similar passages in the Science the reader
may wonder whether Wigmore's proposed scheme is a psychological
one, offered to answer the question "what ought to be the effect
of evidence in general or in a particular determination?'.   This
reading may be suggested by sentences such as "[w]hat we are aiming
to analyze is the actual mind to mind process of persuasion and
belief."[41]   What is the psychological object of such scheme?[42]
The object,of course, is to determine rationally the net persuasive
effect of a mixed mass of evidence.[43]   But neither the scheme nor
these passages were meant to regulate or control the psychological
process of the fact-finder in believing or not believing a
particular inference.   According to Wigmore that psychological
process cannot be regulated by logic.   The reasoning process itself
as a psychological process is not logical.

> For example, assuming that the mind has accepted certain
> subordinate facts, A, B, C, D, and E; and that A, B, and
> C point to X, the defendant's doing of an act, while D
> and E point to not-X, i.e. his not doing it; there is no
> law (yet known) of logical thought which tells us that
> (A + B + C) + (D + E) must equal X, or must equal
> Not-X.   We know only that our mind, reflecting upon the
> five evidential data, does come to the conclusion X, or
> Not-X, as the case may be.   All that the scheme can do
> for us is to make plain the entirety and details of our
> actual mental process.   It cannot reveal laws which should
> be consciously obeyed in that process.[44]

In this sense it is a method which aids a fact-finder to register
and preserve his determinations about the impact of evidence on
his mind throughout the trial process.   For Wigmore:

> [T]o achieve this much would be a substantial gain, in
> the direction of correctness of belief.   Each separate

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41. Ibid. p 7.

42. Ibid. p 46.

43. Id.

44. Ibid. p 860-1

> proferred fact is tested in our consciousness, and the
> result is recorded. Perhaps we cannot explain why
> we reach that result, but we know at least that we do
> reach it. And thus step by step we set down the
> separate units of actual belief, - connecting, subsuming,
> and generalizing, until the subfinal grouping is
> reached; then dwelling in consciousness on that; until
> at last a belief (or disbelief) on the final fact evolves
> into our consciousness.[45]

This does not however mean that Wigmore did not provide any

guidance to the fact-finder to help him perform that task.   The

science was also meant to indicate the problems of inference in

relation to the complexities of a judicial trial, and offer

appropriate steps which are necessary to be followed by the fact-

finder in order for him to apprehend and effectively tackle those

problems.[46]

The method which Wigmore proposed to help the fact-finder

in performing his fact finding task takes for granted the inferential

nature of the judicial fact finding process.   It is meant to aid

the trier of fact in making correct inferences with regard to individual

items of evidence. [47]   It describes what Wigmore considers to be the

logical nature of that task rather than its psychological aspects. [48]

The method aims at describing the logical forms of inference without

laying any claim to describing how inferences are actually made. [49]

Wigmore made a clear distinction between the logical and psychological

aspects of the fact finding task. [50]   His method is an attempt at a

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45. Ibid. p 862

46. See generally ibid. ch. 2 esp. pp 22-39, and ch. 30.   .

47. Ibid. pp 7, 9-10 and 37.   .

48. Ibid. pp 9, 35 and ch. 2 pp 18-39.

49. Ibid. p 7.

50. See ch. 3, pp 51 et seq, and his detailed account in parts II, III
and V.

logic of proof as he understood it. It provides the abstract logical

forms of inference, its possibilities with regard to different kinds

of evidence commonly encountered in judicial inquiries, the possible

explanations and corroborations of such inferences, the mental

processes involved in drawing, explaining away, or corroborating

them. [51] It also describes the manner in which, and the stages involved,

in the valuation of such inferences. [52] Wigmore also provided a

chart method for the fact finder to record and preserve his actual

beliefs regarding the evidence throughout the trial process. [53]

An underlying assumption which is central to his method and

analysis is that the process of judicial proof is a scientific

inferential process. [54] Since a scientific inferential process

should have its nomological structures, Wigmore saw in common sense

generalizations the appropriate nomological structures of inference

for individual items of evidence.[55] He doubted, as I have already

noted, the ability of both experience and logic to provide a method

for a complex mass of evidence. [56] However, he noted a number

of differences between inference in natural sciences and inference

in the science of judicial proof. [57] One difference is that the link

between a law of natural science and its initial condition is always

direct and the inference is a necessary one. [58] The inferential nature

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51. See chs. 1 and 2 and pp 310 et seq.

52. Ibid. chs. 1 and 2.

53. See chs. 30-31.

54. See Ibid. pp 3-5 and 38-48.

55. Ibid. pp 21-22 and 53-54.

56. Ibid. p 8.

57. Ibid pp 23 et seq, 27-28 and 310.

58. Ibid. pp 13 et seq.

of judicial proof is different. The conjunction of an evidentiary item and its covering law does not provide a necessary conclusion because of the existence of other laws which are capable of explaining away the proposed inference.[59] Again unlike in scientific inference where the evidentiary proposition can be directly subsumed under its covering law to yield the necessary conclusion the position in judicial inquiries is different, inferential process consists of a chain of inferences linking the evidentiary items with ultimate probandum.[60] These two characteristics (the catenated nature of inference and the possibility of alternative explanations) enabled Wigmore to express the possibilities of various logical forms of inference available in the commonly encountered facts in litigation and the mental processes involved in drawing and explaining them. His _Science_ is generally an abstract analysis of these forms and processes.

Like Bentham, Wigmore provided in addition to his abstract analysis a prescriptive guide as to the manner and order in which the probative force of evidence should be determined.[61] He seems to regard the contentious nature of legal trials, the manner of presenting evidence piecemeal, the practise of hearing the whole evidence of one party before hearing that of the other, as important factors in shaping the prescriptive standard for the determination of probative force. [62] The determination of the probative force of the different items of evidence, according to Wigmore, follows the manner and order in which

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59. See _Ibid_. pp 23 _et seq_, and p 310.

60. _Ibid_. pp 13 _et seq_.

61. See _ibid_. ch. 2.

62. See _ibid_. pp 24-5 and 47.

the evidence is introduced.[63]   Accordingly an assertion of an item

of direct evidence should be assigned initially the full measure of

certainty (100%).[64]   The original value of an inference is, however,

liable to be reduced by the value of any explanation offered by the

opponent.[65]   When the original value of an inference is decreased,

the proponent may introduce corroborative evidence to restore that

value.[66]   The same manner of evaluation applies to circumstantial

evidence, except that an inference from circumstantial evidence

should be assigned a value less than certainty.[67]

        This atomistic, sequential and timeless weighing of inferences

and their explanations, and its underlying assumption that any

assertion about any possible fact is necessarily followed by an

inference which must stand unless explained away,[68] diverted Wigmore's

attention from the most important questions about judicial proof.

Wigmore's analysis assumes that each and every item of relevant and

admitted evidence is also probative.[69]   His analysis, for this reason,

contains no clear distinction between relevancy and weight.   He did

not consider the reliability of the evidentiary items as a condition

for its use in an inferential mechanism.   He did not stress the

eliminative process involved in weighing the admitted evidence in the

context of a legal trial.   It is true that his analysis indicates

a final selection by the fact-finder of either the inference or its

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63. Id.

64. Ibid. p 310.

65. Ibid. p 311.

66. Id.

67. See ibid. p 310.

68. Ibid. pp 46 and 310 et seq.

69. See ibid. p 46 where Wigmore   stated 'Many data, perhaps multi-
farious, are thrust upon us as tending to produce belief or disbelief.   Each
of them (by hypothesis) has some probative bearing.' See also ibid. p 25;

explanation. But this is possible only if the facts indicating the inference and those indicating its explanation are both genuine and the inferential nature of the task is conceeded. If, as most factual situations in judicial trials show, the two evidential items cannot both be genuine, then, probative force cannot provide the criterion for selection. As I will show in part III of this thesis there is a better standard for selection which takes into account the genuineness of the evidence, its particular probative force in the trial context, and its sufficiency to establish the probandum to which it relates.

The main function of his chart method as he stated it is both to perform the logical (or psychological) process of consciously juxtaposing the detailed ideas, for the purpose of producing rationally a final single idea.[70]   It represents the various logical forms of evidence and the mental processes involved in them, all the possible individual ideas which can be inferred from them, their relationship to one another and to the principal probandum, the actual beliefs and disbeliefs by the fact-finder of individual facts from which he can make his final judgment.[71]

If it can be assumed that a rational fact-finder proceeds in accordance with the Wigmorean analysis of evidence (which is atomistic, sequential and timeless), then, his chart provides a prescriptive as well as a descriptive record of the performance of any particular task. It is descriptive from the point of view of the fact-finder. However, as we shall see, atomistic analysis and the tradition in which it originated failed to capture some important features of evidence and its

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70. Ibid. p 48.

71. Ibid. pp 859-860.

structure in a trial context which calls for a significantly

different approach to the matter.

PART II

THE PROBABILITY DEBATES

Introduction

The main object of this part of the thesis is threefold:
(i) it attempts a simple exposition of probability theory, its basic
concepts as well as its different interpretations and formal structures;
this is meant to provide the necessary background knowledge for the
understanding and assessment of the technical account about the use of
probability theory and its formal structures for the presentation and
analysis of evidence in Judicial Inquiries; (ii) an expository
account of Cohen's philosophical argument against mathematical
probability together with a summary of his alternative inductive
probability and its basic formal structures; (iii) and finally an
account of the objections which Jonathan Cohen urges against mathe-
matical probability and his suggested resolutions of these objections
under the inductive probability system. While chapters 4 and 5 are
basically expository, chapter 6 attempts a critique of Cohen and
some of his critics with the object of emphasizing that both of them
subscribe to the same basic atomistic assumptions.

CHAPTER FOUR - **Probabilities**

A. Judicial Probability

As we have already seen evidence scholars refer to
individual items of evidence as grounds of probability, and to the
judgment on each item or the final judgment on the evidence as a
whole as a probability judgment.[1] The civil standard of proof
which fact-finders are required to observe is expressed in

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1.   See above. chs. 1, 2 and 3.

probabilistic terms (eg. proof on the balance of probability),
together with other comparative probability statements and concepts
(eg. probabilities, values, scale of values, probative force, more
probable than ..., less probable than... etc.). Almost all these
concepts and expressions were first used at a time when symbolic
logic was unknown.[2] But even after symbolic logic was developed
no lawyer, up to this day, has argued seriously that judicial proof
in practice employs mathematical probabilities other than in
exceptional cases. The issue however has recently attracted the
attention of both lawyers and non-lawyers in what is known currently
as the probability debates.[3] In these debates the assumption is
made that the judicial fact finding task is probabilistic; according
to one view its formal structure conforms to the calculus of
chances, and according to another view that calculus is inapplicable,
in part, because of its incompatibility with certain legal standards
and principles in the Anglo-American legal systems.[4] According to
this latter view judicial fact finding employs a completely different
system of probability, which is termed inductive or Baconian
probability. There is a third view that, though unrelated to the
current probability debate, is relevant to them. This provides an
unprobabilistic structural model for the analysis of the judicial
fact finding task based on the structure of the story.[5] This last
view will, in due course, be contrasted with the two models at issue

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2. See E. Nagel and R. Newman, Godel's proof, (1958) pp. 40-41, where it
is stated that 'symbolic logic was invented in the middle of the 19th century
by the English mathematician G. Boole (1847).'; P. Edwards, (ed.),
Encyclopeadia of Philosophy, (1967, 1972), (History of Modern Logic.)

3. See above, n 122, p. 87.

4. J. Cohen, The Probable and the Provable (1977), p

5. W. Lance Bennett and Martha S. Feldman, Reconstructing Reality in
the Courtroom, (1981); see also below ch. 8, n. 10.

in the probability debates.

Since I am going to argue that judicial fact finding, in the sense in which I am using it, is not probabilistic, I regard the second and third views as relevant to my thesis in a rather negative way. The second, because of its attempts to exclude mathematical probability, the third, since it provides a model which is non-probabilistic. I shall, however, argue against the claims of each of the three views to provide an adequate theoretical basis for the analysis and explanation of the task of judicial fact finding. By this I do not mean to say that they have no role to play in the task, but whatever role they have it is not a fact finding role. This point will be discussed further in due course; but first it is necessary to explicate what is meant by mathematical probabilities; the mathematical calculus of probabilities and its basic properties; and some of its philosophical interpretations.[6]

B. Mathematical Probability

As we shall see shortly a mathematical probability is different from the mathematical theory of probability, the mathematical calculus and its interpretations, and the pre-suppositions of an interpreted system of probability. In short, the Mp(A) is the possibility of A's happening, and hence falls between impossibility

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6. For a very simple account see R. Eggleston, Evidence, Proof and Probability, (1978, 1983) ch. 1 and 2; for a lucid and very useful presentation see D. Schum 'A Review of a Case Against Blaise Pascal and his Heirs', (1979) 77 Mich. L. Rev. 446; see also D Kaye, 'The Laws of Probability and the Law of the Land', (1979) 47, U. Chi. L. Rev. 34; Brilmayer and Kornhauser, 'Quantitative Methods and Legal Decisions', (1978) 46 U. Chi. L. Rev. 116; M. Finkelstein, Quantitative Methods in Law, (1978); an elaborate and difficult account can be found in T. Fine, Theories of Probability, (1973); A highly technical and extremely difficult source is A. N. Kolmogorov, Foundations of The Theory of Probability (1950); see also K. Popper, The Logic of Scientific Discovery, (1938), 1872) appendix *ii p 318.

and certainty.   In mathematical terms the calculation is done within

the interval of zero to one inclusive.   This interval is known as the

probability scale.   Though there are various interpretations of the

mathematical calculus, we shall consider at this stage only two of

these interpretations.[7]   The first of these is the classical inter-

pretation of the calculus.   The second is the statistical or frequency

interpretation of the calculus.   The classical interpretation is an

a _priori_ interpretation, based on knowledge of a class and its members

and assumptions about them;   from that knowledge and assumptions

the chances of the several outcomes can be numerically calculated, and

combined in different ways.   When, for example, we determine the

probability of a tossed coin landing heads to be .5 we do this (a) on the

basis of the assumption that coin can land either heads or tails (landing

on an edge being excluded), (b) the assumption that the coin is a fair

coin by which we assume that either outcome is equally possible, (c)

the assumption that the two equi-possible outcomes are mutually

exclusive, ie. they cannot both happen at the same time.   These

assumptions, about the coin, together with the assumption that the

probabilities of all possible outcomes sum to one enable us to calculate

exactly the probability of each outcome   We have in this case only

two possible outcomes which are mutually exclusive: the probability

of each outcome is the ratio of the number of cases it embraces to the

total number of possible cases.   In other words, as certainty,

(i.e. 1), is represented by the disjunction of the two outcomes, (heads

or tails), then the probability of either disjunct is .5.   Impossibility

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7.   The following specialized sources on the philosophical problems of
probability have been consulted for the purpose of this chapter: R
Carnap, Logical Foundations of Probability, (1950, 1962) esp. chs. 2 and
4;   K. Popper, op.cit. ch. 8 pp 146 et seq.;   W. Salmon, The Foundations
of Scientific Inference (1969, 1971), pp 56 et seq., L. J. Cohen, The
Probable and the Provable, op.cit. chs. 3 and 9;   F. C. Benenson,
Probability, objectivity and Evidence, (1984);   see also P. Edwards, (ed.)
Encyclopaedea of Philosophy, (1967-1972).

on the other hand (i.e. zero), is represented by the conjunction of the two outcomes (heads and tails happening together at the same time).

If, however, we have no reason to assume the fairness of the coin, an assumption that is obviously necessary for the ascertainment of the probabilities of the binary outcomes, or if the outcomes are infinite in number, the probability of an event would have to be ascertained empirically, and this can be done provided that the process is repetitive. This, however, leads to different interpretations, i.e. the frequency interpretation. For example, if we want to ascertain the probability of heads in a toss of a particular coin we perform an experiment in which we toss the coin in a finite sequence of tosses, and then observe the frequency of heads in that sequence. The probability of heads is then said to be the limit of the relative frequency of heads in a long run of tosses. The frequency interpretation would postulate that if the probability of heads was 0.5, then in an infinite run of tosses the number of tails would tend to be equal to the number of heads. Evidence that this is so would be the fact that in a trial of one thousand tosses there were say four hundred and ninety-nine heads and five hundred and one tails. It is important to note at this stage that according to these two interpretations the principle according to which the probabilities of known ascertainable outcomes is determined either a priori (classical probability), or empirically ascertainable prior to their occurrence. This seems to be one of the main explanations of the general agreement among the 'mathematicists' that these interpretations are not suitable for the determination of judicial probabilities. For, the first interpretation is normally rejected as relevant to judicial probability precisely because it is a priori, and we can give no meaning to 'equi-possible' considered in the contexts in trials. Whilst the second interpretation is

rejected because though sensitive to empirical evidence, it seems that often in a trial there are no relevant frequencies, and more <u>importantly</u>, the interpretation cannot apply to a single case.[8]

Another philosophical interpretation of the mathematical calculus is the personalist or subjective interpretation. Strictly speaking the personalist or subjectivist interpretation of probabilities provides no criteria for the determination of probabilities. According to that interpretation a probability is the quantification by the subject of his degree of belief in the outcome in question. It is the actual degree of belief according to one version,[9] and rational degree of belief according to another.[10]

The simple example of a random process involving two finite outcomes which are independent and mutually exclusive (heads and tails) has so far been used for the purpose of elucidating how probabilities are determined, and also for the introduction of the different philosophical interpretations of the mathematical calculus. the probabilities thus determined are known as fundamental probabilities. The fundamental probability of a head on a toss of a fair coin is .5. In symbolic terms it is written PM (A).

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8. <u>See</u> below ch. 9 p. 226.

9. See W. Salmon, <u>op.cit.</u> p 68; see also n. 15 below.

10. There is a vast body of literature on the meaning and criteria of measurement of 'rational' estimates of subjective probabilities. The following sources, however, are adquate for our purposes, H. E. Kyburg, and H. E. Smokler, (eds.), <u>Studies in Subjective probability</u> (1964); L. J. Good, <u>Probability and the Weighing of Evidnece,</u> (1950); L. J. Savage, <u>Foundations of Scientific Inference,</u> (1954); B. de Finetti, <u>Probability, Induction, and Statistics,</u> (1972); F. C. Benenson, <u>op.cit.</u> pp 43 <u>et seq</u>; see generally, R. Carnap, <u>op.cit.</u> p 238; K. Popper, <u>op.cit</u> p 48; for legal literature discussing the use of subjective probabilities in estimating evidence see, for example, D. Schum, 'Empirical Studies of Cascaded Inference in Jurisprudehce', <u>op cit</u> pp 3-5; M. Finkelstein, <u>op.cit.</u> Brilmayer, and Kornhauser, <u>op.cit.</u> p. 116 ; D. Kaye, <u>op.cit</u> p 41.

It is now time to turn to two important concepts; independence, and conditional probability. Although these concepts are not relevant. to the determination of fundamental or prior probabilities, they are relevant to the derivation of further probabilities when fundamental probabilities are given. Their introduction at this stage seems necessary for the proper understanding of some important properties of the probability calculus and their operation which we shall consider in the next section.

To illustrate the discussion of the last two mentioned probability concepts we shall select a standard pack of cards as our reference class. The selection or choice of a standard pack of cards has important epistemological significance for our purposes. For instance we know that a standard pack of cards contains 52 cards, sub-divided into four suits (spades, diamonds, clubs and hearts). Each suit contains 13 cards which are distinguishable from the others by a different combination of colours, shapes and numbers. Accordingly each card has a property which distinguishes it from every other card; while it has certain properties which are shared by some or all other cards. Any one of these properties, or the combination of some of them, are all possible outcomes in any random draw when each card has an equal chance of being drawn. The assumption of equi-possibility is reinforced by assuming that the pack is well shuffled. The outcome of a draw whose probability we may want to determine may relate to a property which distinguishes a card from every other card (e.g. The Queen of Spades), or a property which is shared by some other members (e.g A Queen, any Queen), or by all members (e.g. the property of being a card). The fundamental probability involving a property, which distinguishes a card from every other card is its ratio in relation to the reference class as a whole, in our example 1/52. When, on the other hand, the desired outcome involves a property shared by the other

members of the reference class, then the probability becomes higher. The reason is obvious: in the case of the distinguishing property of a card we allow for the draw of the equally possible distinct cards, which are in our case 51. In the latter case we take into account not only the total number of the reference class into account, but the more the number shares that property, the less becomes the possible cases we have to exclude. This is why the probability of drawing a red Queen is 1/26 while the probability of drawing a red card is 1/2.

It will now be easy to explain the concepts of independence and conditional probability. As we shall see, these two concepts have assumed a great importance in the debate about the application of mathematical probability to the judicial fact finding task. It is important, therefore, at this stage to explicate briefly what we mean by independence and conditional probability. An event is said to be independent of another when the happening of either of them does not change the probability of the other. The point is generally illustrated by reference to an experiment involving two mutually exclusive outcomes like the toss of a coin. For instance if a fair coin is tossed and the outcome of the toss is heads, the probability of the next toss is still .5 for both heads and tails. If on the other hand the assumed occurrence or truth of an event affects or changes the evaluation of the probability of either, it is said that the two events are dependent, or that they condition one another. This situation arises, for instance, when the conditioning event reduces either the membership of the reference class, or the attribute class, or both. An example of such situation is when we try to determine the probability of drawing two successive cards from the same suit without replacing the card drawn. The first draw, whatever its outcome may be, reduces the membership of the reference class. If it also happens to be the desired outcome it

also reduces the membership of the attribute class by one card.
Accordingly while the probability of the first draw is 13/52 the
probability of the second draw is either 13/51 or 12/51 as the case
may be. When conditional probability is expressed in symbols then
it is written MP(A,B) Meaning the probability of A given the truth
or occurrence of B.

C. The Formal Structure of Mathematical Probability

In the foregoing discussion I tried to explicate some
probability concepts and show how probabilities as simple numerical
values are determined, and how these values can change or remain the
same under certain conditions. I attempted also to explain and
justify in ordinary words some operations of mathematical probability
with the intention of excluding formal or symbolic content as much
as I could. I meant by that general survey to introduce, in ordinary
language, most of the ideas from which formal representation is given,
and the formal structure of the calculus of probability. As we shall
see one of the main objections to the application of mathematical
probability as a formal structure for the judicial fact finding task
is that some of its principles produce certain paradoxes which offend
against certain rules and standards of the common law. The two
principles objected to are the negation and the multiplication principles.
The objection has been raised by Mr. Jonathan Cohen in his book, The
Probable and the Provable.[11] However, the critics of Mr. Cohen have
resorted to other properties and rules of mathematical probability for
the purpose of criticizing Mr. Cohen's book, and in support of the
thesis that judicial fact finding is a function of mathematical
probability. Professor David Schum who wrote one of the best reviews

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11. (1977).

of The Probable and the Provable mentioned in his review seven

properties of mathematical probability. These properties included

in addition to the properties objected to by Mr. Cohen some basic

axioms, as well as a form of Bayes theorem which is very important

for our purposes. Schum's list is as follows:[12]

(i)   For any event E, $P_M(E) \geq 0$; for any events E and F
      where $P_M(F) \neq 0$, $P_M(E|F) \geq 0$.

(ii) Let S be the 'sure' event; one that is certain to occur.
      Then, $P_M(S) = 1$, and for any E where $P_M(E) \neq 0$, $P_M(S|E) = 1$.

(iii) Suppose events E and F are mutually exclusive, then
      $P_M(E \cup F) = P_M(E) + P_M(F)$. Assuming $P_M(G) \neq 0$, $P_M(E \cup E|G) =$
      $P_M(E|G) + P_M(F|G)$. This is the so-called additivity
      property

(iv) Let E^C be the complement of event E (i.e., E^C = 'not E').
      Since $E \cup E^C = S$ and E and E^C are mutually exclusive,
      $P_M(E) + P_M(E^C) = 1$. Assuming $P_M(F) \neq 0$, $P_M(E|F) +$
      $P_M(E^C|F) = 1$. This is the negation rule.

(v)   For any two events E and F, $P_M(E \cap F) = P_M(E) \times P_M(F|E)$
      where $P_M(E) \neq 0$. If $P_M(G) \neq 0$, $P_M(E \cap F|G) = P_M(E|G) \times$
      $P_M(F|E \cap G)$. This is the conjunction or product rule.

(vi) Suppose event E fails to condition or change opinion about
      the likeliness of F; i.e. $P_M(F|E) = P_M(F)$. In this case,
      events E and F are said to be independent and $P_M(E \cap F) =$
      $P_M(E) P_M(F)$. Suppose $P_M(F|E \cap G) = P_M(F|G)$; this asserts
      that events E and F are independent conditional upon the
      occurrence of G. In this case the product rule for
      conditionally independent events is $P_M(E \cap F|G) = P_M(E|G) \times$
      $P_M(F|G)$, provided $P_M(G) \neq 0$.

(vii) Let H_1 and H_2 be mutually exclusive events where $P_M(H_1) \neq$
      0, $P_M(H_2) \neq 0$. For any event E where $P_M(E) \neq 0$, $P_M(E|H_2)$
      $= 0$, and
      PM $(H_2|E) \neq 0$,
      $$\frac{P_M(H_1|E)}{P_M(H_2|E)} = \frac{P_M(H_1)}{P_M(H_2)} \times \frac{P_M(E|H_1)}{P_M(E|H_2)}.$$ This is the

      'odds-liklihood ratio' form of Bayes's rule, a derived
      property of conditional or dyadic probabilities. The

12.   D. Schum, 'A Review of a Case Against Blaise Pascal and his Heirs,"
      op.cit. p 453.

left-hand term represents the posterior odds of H_1 to H_2 given E. The first term on the right is called the prior odds of H_1 to H_2. The second term on the right is called the likelihood ratio of event E.

Those who argue that judicial fact finding can in principle be numerically quantified[13] argue that one of the interpretations of the calculus or a combination of them is, or can be, applicable to the determination of the numerical values of evidentiary items, and, further that the probability calculus can be employed for the further combination and calculation of such values.[14] Some of the supporters of mathematical probability argue simply that all probabilities are mathematical, including judicial probabilities though they can not be quantified in practice.[15] According to this view judicial probabilities are non-numerical theoretical probabilities.[16]

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13. See, for example, G. Williams, 'The Mathematics of Proof I-II', [1979] Crim. L.R. 297, 340; R. Eggleston, 'The Probability Debate', (1980), Crim. L.R. 678.

14. See n. 13 above; see also D. Schum 'A Review of the Case Against Blaise Pascal and his Heirs', op.cit. p 452; D. Kaye, op.cit. pp 41 et seq.; P. Tillers, Modern Theories of Relevancy', op.cit. section 37.6 the uncritical assumption of the probabilistic and inferential nature of judicial fact finding by most writers has generated three different yet broadly related concerns in probability theory: (a) a general theoretical concern in (i) identifying the probability system which governs the judicial reasoning processes (mathematical or non-mathematical 'Cohen et al'), (ii) a search for legal authority to support a claim that one probability system rather than an other is applicable, (iii) the introduction of such a system, the explanation of its principles and formal structures, (iv) the criticism of (iii) above; (b) identifying the formal structures which can be employed (i) to analyse and assess statistical evidence (e.g. Finkelstein, Fairly and Tribe, (ii) to combine statistically derived values with ordinary evidence (I. Hacking, Ekelof and Stening), (iii) to analyse and combine all types of evidence for a case as a whole (Schum et al); (c) to provide a prescriptive standard for judging the accuracy and/or consistency of fact finding (Schum et al.).

15. See G. Williams, op.cit. p 297 at p 214 ; M. C. Ockelton, op.cit. pp 66-69; R. Eggleston, 'The Probability Debate', op.cit. at p 687, and Evidence, proof and probability, op.cit. p 207.

16. G. Williams, op.cit. p 299.

According to another extreme view, judicial probabilities can be quantified as subjective probabilities and can be combined by use of a modified Bayesian theorem.[17]   The former view is maintained on the assumption that Mr. Jonathan Cohen failed to make a prima facia case against mathematical probability.[18]   The latter view is based on the assumption that Mr. Cohen's argument did not exclude completely the application of mathematical probability to judicial fact-finding.[19] Both views will be considered later on.   In the next chapter I shall consider Mr. Cohen's arguments against the application of mathematical probability to judicial fact-finding.

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17.   D. Schum, 'Empirical Studies of Cascaded Inference in Jurisprudence: Methodological Considerations', op.cit.

18.   See G. Williams, op.cit at p 354;

19.   D. Schum, 'A Review of a Case Against Blaise Pascal and his Heirs', op.cit. p 477.

CHAPTER FIVE

Cohen's arguments against
mathematical probability.

A. Introductory Remarks.

Mr. Jonathan Cohen, who assumed the probabilistic and
inferential nature of the judicial fact finding task, argued that
none of the existing criteria is applicable to the determination of
the probabilities involved,[1] and that even if any one of them is
applicable some of the formal principles of the calculus are
contradicted by judicial standards, and generate paradoxes.[2] Mr.
Cohen maintained two lines of attack against the system of
mathematical probability. One attack seems to attempt to expose
the inappropriateness of the calculus, and its several interpretations
to deal with certain tasks which fall outside the scope of their
inference rules. The other is based on the incompatibility of
certain principles of mathematical probability with legal prescriptions.
For some reason known to Mr. Cohan alone, he expressly made the
acceptability of his thesis against mathematical probability
conditional upon the validity of his legal arguments.[3] Not
surprisingly his opponents, being mostly lawyers took him by his
admissions and dismissed his claim on that ground.[4] Since his

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1. See, The Probable and the Provable, (1977), Chs. 1, 2, 3 and 9.

2. Ibid. Chs. 4-8.

3. Ibid. p 118; see also, 'The Logic of Proof' [1980] Crim. L.R., p 91.

4. See G. Williams 'The Mathematics of Proof I -II' [1979] Crim. L.R.
297 and 340 at p 354; R. Eggleston, 'The Probability Debate' op.cit.
pp 687-8; see also R. Eggleston, Evidence, Proof and Probability
(2nd ed.), op.cit. p 44; see C. M. Ockelton 'The use of Mathematical
Probabilities in Assessing Corroborative or Convergent Testimonies',
(1982) Ratio XXIV, I. pp 61 and 69; but see J. Cohen, 'The Problem of
Prior Probabilities in Forensic Proof', ibid. p 71.

first line of attack is at least as important as his second, I shall deal with both. I shall refer to the first line of attack as the 'philosophical argument', to the second as the 'legal argument'. In this chapter I shall deal with the philosophical argument.

B. The philosophical Argument.

1. Probability and provability

Mr Cohen seems to concentrate in the first two chapters of his book, The Probable and the Provable on establishing his poly-criterial account of probability through the hypothesis that probability is a generalization on the notion of provability. However, the same arguments are relevant in showing that the various probability criteria are inappropriate to the determination of the type of probabilities involved in law courts. The inappropriateness of some of them is due to the fact that probabilities are predicated collectively, while individual events require criteria which predicate probabilities distributively, and take fully formed sentences as fillers of their argument places. Other criteria which predicate distributively and assign values to individual events are excluded, because the conditions for their applicability are generally not satisfied in judicial fact finding contexts and for other reasons to be stated below. Another important argument is that one of the basic principles of mathematical probability is a property of what Mr Cohen referred to as a complete deductive system. The mathematical principle in question is the com-plementational principle for negation. Mr Cohen argued further that this principle does not apply to what he referred to as an incomplete deductive system. If judicial proof counts as an example of an incomplete deductive system, and the two arguments of Mr Cohen are valid, then these arguments can be seen as providing a strong argument against mathematical probability, and one that is independent of his legal

arguments.   In what follows I shall consider his main arguments in support of these points.

a. Criteria problems.   Cohen accepted the proposition that the mathematical calculus is a purely formal system which does not count as a theory.[5]   From that position he viewed the rival interpretations of the calculus and their claim to provide a monocriterial interpretation as misconceived.[6]   He argues that a poly-criterial account of probability is possible if probability is to be regarded as a gradation of provability, and thus as a degree of inferential soundness.   The main force of his argument was intended to establish a poly-criterial account of probability.[7]   However, the same argument can support the two above mentioned claims against mathematical probability;   namely that its various philosophical interpretations are inappropriate for the determination of judicial probabilities;   the complementation principle for negation is a characteristic of complete deductive systems, whereas the complement of provability is disprovability.   On this argument, judicial proof belongs to an incomplete deductive system according to Cohen.   Since a complete deductive system is a paradigmatic model of probability he started with that model in order to categorise different types of provability and point out their probabilistic analogues:[8]

> In any artifical language-system one formula B is said
> to be provable from another A if and only if there is a
> primitive or derivable syntactic rule that licenses the
> immediate derivation of B from A.   But the kind of
> provability that conerns us in the present inquiry is
> not purely syntactic.   So, to avoid confusion, let
> us speak of a (primitive or derivable) syntactic proof-
> rule as being inferentially sound, in an interpreted

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5.   J. Cohen, The Probable and The Provable; op.cit. pp 7-8.

6.   Id.

7.   Ibid. p 14.

8.   Compare above ch. 1, Section C;   see also B Shapiro, Probability and Certainty in Seventeenth Century England, 1983.

system S, if and only if the conclusion of any derivation which it licenses is true whnever the premiss or premisses are. Then the hypothesis to be considered is that probability is degree of inferential soundness. To grade the probability of B on A is to talk qualitatively, comparatively, ordinally or quantitatively about the degree of inferential soundness of a primitive or derivable rule that would entitle one to infer B immediately from A. And, just as demonstrative provability, when philosophically reconstructed, is always relative to the primitive derivation-rules of some particular deductive system, so too degree of probability is always relative to some particular criterion.[9]

Since Cohen assumes that different types of provability in a complete deductive system have similar probabilistic analogues, he argues that the characterisation of this type of provability is made by asking three questions about provability in complete deductive systems, which can also be asked 'as a step towards disambiguating the comparative sentence-schema of natural language (... is more probable than -.-.-. on the assumption ---), or towards determining the variety of meanings available for a functor 'P[...,---]' that maps probabilities on to numbers'.[10]

These questions are as follows: '[i]s a typical statement about such provability general or singular? Is its truth necessary or contingent? Is it extensional or non-extensional?'[11]

A proper understanding of these six concepts used in these three binary questions requires a fair knowledge of propositional logic. For this reason the very curt explanatory statements of them given by Mr. Cohen are of very little use to a reader without a background in propositional logic.[12] However, the probabilistic context in which they are applied provides a useful contextual indication of what they refer to. The appended list of some of the terms may also help (see appendix I).

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9. J. Cohen, The Probable and the Provable, op.cit. pp 14-15

10. Ibid. p 16.

11. Ibid. p 15.

12. Ibid. pp 15-16.

(i)   The probabilistic analogue of a demonstrative rule which
is general, necessary, and extensional is the rule that legitimates
inference according to the classical criteria of probability.[13]
An example of such a statement is 'the probability of a number's
being prime, if greater than 10 and less than 20 may be said -
informally - to be .5, ...'.[14] In this statement we have two
predicables which are 'is prime' and 'is greater than 10 and less
than 20'. When predicables such as these are used as fillers of
the argument places of the probability functor, then the statement
about provability is said to be general. What is mapped by the
probability functor is an ordered pair of sets on to a number. The
statement is necessarily true of the ratio of one set membership to
another, but it has no application to any specific member of either set.
Since any description of a prime number as a type of number is
substitutable for any other description of a prime number within both
the reference and attribute classes, the truth of the statement is
preserved when such substitution takes place and the statement is
referred to as extensional. The soundness of the rule which entitles
us to state the probability of a number within the class of numbers
which are greater than 10 and less than 20 being prime is .5, is
assessed by reference to the rate of success of that rule. The rate
of success of the rule is .5 because out of the 8 members of the
reference class 4 are prime numbers.[15]

It is generally agreed that the classical criterion, on account
of its a priori nature and the requirement of randomness for its
application, for which the absence of empirical evidence is at least

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13. Ibid. p 16.

14. Ibid. p 18.

15. Id.

initially a necessary condition, has no application to findings in both natural and social sciences.[16]   Cohen excluded it for these reasons and

> [B]ecause this criterion is concerned with the extensions of predicables, what it makes probability-functions map on to numbers are ordered pairs of _sets_.   So the criterion assigns probability-values collectively, not distributively, and it cannot guarantee application of the collective value to individual outcomes.   There is a .5 probability that any number you choose which is greater than 10 and less than 20 will be a prime, but there is certainly not a .5 probability that the number 15 is a prime.[17]

(ii)   Another criterion that authorises the derivation of inference rules which are general, extensional and non-contingent is the frequency interpretation of mathematical probability.[18]   Such criterion authorises the derivation of inference rules to solve such problems as: 'from a man's being a lorry driver, infer his survival till age seventy.' [19]   The soundness of such a rule may be empirically assessed as a ratio or a limit of frequency as we have already seen. But as in the case of classical criteria, and for the reasons we have already given, the probabilities in both cases are assigned collectively not distributively.   The point made by Cohen against this criterion is as follows:

> So this conception, if strictly construed, has the disadvantage of not indicating any simple, direct and trouble-free method for assessing the probabilities of mere individual events.   If in these terms we speak of the probability that John Smith, _qua_ lorry driver, will survive till seventy, we are not so much speaking about John Smith _tout court_ as about any randomly picked lorry-driver, and we are still not speaking specifically about John Smith _tout court_ if we get nearer to identifying the intersection of relevant sets to which he belongs and speak of him _qua_ fifty-year-old, British, diabetic, father of four children, living next to an asbestos factory, son of a suicide, and so on.   We are grading a probability for

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16.   _Ibid_. pp 18-19.

17.   _Ibid_. p 19.

18.   _Ibid_. p 20.

19.   _Id_.

a certain type of person, not for the individual, John Smith. Also since this conception of probability applies to predicables, not to complete sentences, it does not indicate any obviously plausible way to assess the strength of scientific hypotheses in relation to experimental evidence.[20]

(iii) The probabilistic analogue of rules of demonstrative inference which are general, contingent and non-extensional is the propensity criterion of probability.[21] That criterion envisages probability as a physical connection between two characteristics or properties.[22] Though predicables are used to fill the argument places of the probability functor, what is predicated is a characteristic, not a relation between extensions. One of the two examples he gave involved the explanation of two co-extensive properties in two different kinds of objects. He stated this as follows:

> For example the property of elasticity can be defined (for macroscopic objects) in non-chemical terms. But to explain why a particular kind of thing has such elasticity might conceivably involve reference to the fact that that kind of thing has a certain molecular structure which is coexistensive with the property of elasticity. So the explanation would be essentially non-extensional.[23]

However, according to Mr. Cohen since the inferential soundness of such rules depends on the strength of the physical connection between the characteristics when the connection must be 'immune to interference by other causal factors',[24] the propensity conception of probability is applicable only under these conditions or 'only when some actual or possible scientific theory is supposed, as perhaps ideally in atomic physics, to predict or explain the precise strength of the particular connection involved, quite apart from sample-based estimates of that strength.'.[25]

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20. _Ibid._ pp 20-21.

21. _Ibid._ p 22.

22. _Id._

23. _Id._

24. _Ibid._ p 23.

(iv)   The conceptions of probability so far considered provide
criteria of inferential soundness which are general. Mr. Cohen
considered next another type of inference rule which is singular,
and which is either necessary or contingent, together with analogous
probability functions.[26]   Since these functions take as fillers of
their argument places fully formed sentences they can provide for
individual events.[27]   He gave as an example of the criterion of such
rules the logical interpretation of probability which allowed the
assignment of probabilities to propositions reporting events rather
than the events themselves.[28]   Carnap's programme of inductive
logic provides an example where inferences are necessarily true
according to the range measurements that exist between an evidential
report and a hypothesis 'where   the range of a sentence s in a
language-system L is the class of those state-descriptions in L -
i.e. descriptions of possible worlds - in which s holds true.'.[29]
Though this conception of probability provides for individual
propositions about individual events, one of its main shortcomings
is that:

> But even   if such a conception can be adapted, as is
> notoriously difficult, to languages of richer structure
> than monadic first-order predicate calculus, it seems
> inevitably to confront its users with the need to make some
> evidentially unsupported decision, like the choice of
> a preferred Carnapian range-measure out of an infinity
> of available ones.   Such a decision might sometimes be
> a matter of considered policy as regards the degree to
> which prior probabilities should be allowed to influence
> our calculations.   But there seems no way in which the
> decision can be appraised for truth or falsity in the
> light of empirically discoverable facts.   So, as a
> philosophical reconstruction of how people actually

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26.   Ibid. p 24.

27.   Id.

28.   Id.

29.   Id.

reason with one another, the logical theory of probability
is applicable only where some such _a priori_ decision may
legitimately be imputed.[30]

(v)   Finally Mr. Cohen considered probability statements as

psychological or epistemological ones analogous to single inference

rules which are empirically validated and their inferential soundness

is determined by asking:

> [H]ow strongly a rational man does, or should, believe in
> the truth of the conclusion when the truth of the premiss
> is given him.   The inferential soundness of a rule deriving
> B from A might thus be calibrated in terms of the lowest odds
> at which a man who distributes all his wagers coherently
> might bet on B if given A, where at least a necessary
> condition for coherence is that the bettor should not
> distribute his bets in such a way as to ensure an over-all
> loss of money.[31]

He dismissed this criterion on account of its irrationality, because:

> [I]t is not easy to become so rational, well-informed and
> conventionally motivated and because, with wins being
> undiscoverable, betting on open-ended generalisations is
> hardly an appropriate activity for rational men, few
> researchers in the natural or social sciences have in fact
> adopted this personalist approach.[32]

Since the issue of criteria is essential for any argument

for or against mathematical probability, it is essential for Mr. Cohen

to argue that none of the existing criteria are applicable to the

quantification of judicial probability, and the fact that his claim

is conceded in this respect does not detract from the force of his

argument.[33]   However, while Mr. Cohen's analysis is relevant insofar

as it argues that the existing criteria of mathematical probability do

not deal with individual and unique events, either because their rules

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30.   _Ibid_ p 25.

31.   _Ibid._ pp 25-26

32.   _Ibid._ p 27

33.   For a review of Cohen's book by a philosopher, see, Isaac Levi:
'Support and Surprize: L. J. Cohen's view of Inductive Support', (1979)
30 Brit. J. Phil. Sci. p 279;

of inference predicate generally or their inapplicability to types

of events about which judicial fact finding inquiries are concerned,

that analysis is also relevant for a different purpose.   It supports,

in my opinion, the point I have made earlier that the modelling of

probabilistic reasoning on demonstrative models of reasoning, based on

the assumption that probability 'is likeliness to be true', has

resulted in theories of probability which conceived of truth in a time-

less context of predicables and properties, which are appropriate to

such treatment.[34]   However, when the main subject matter of judicial

proof is seen as the investigation of co-existences and co-occurrences

which are not timeless, then the limitations of such reasoning to deal

with these problems are obvious.[35]   When this point is developed

further later, it will be urged against both Mr. Cohen and his opponents.

b.   Another of Mr. Cohen's arguments concerns the complementation

principle for negation.   The thrust of that argument is that the

mathematical complementation principle for negation is a property of

complete deductive systems.   It does not apply to what he termed

incomplete systems which deal with the weight of evidence.   The

argument is important because if it is valid, it excludes not only

mathematical probability, on account of the absence of reliable criteria

for the quantification of judicial probabilities and the alleged

incompatibilities of the properties of the mathematical calculus with

legal standards and prescriptions, but also the calculus as a formal

structure for judicial fact-finding tasks.   Since this argument is the

only direct argument made by Mr. Cohen against the calculus of mathe-

matical probability, and in view of the fact that the argument received

no serious attention from his critics, I shall state it and try to

elaborate it and illustrate it with some examples.

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34.   See above, ch. 1, Section C.

35.   See below, ch. 10.

(i)   What systems are complete?   For Mr. Cohen a system 'is

complete just so long as any formula B is provable from the axioms

if and only if not-B is not provable.'.[36]   The demonstrative provability

of A on B in such a system is one, eg. P[A,B] equals 1 is the limiting

case of probability.   Accordingly the probability of not-B equals zero,

which means that not-B is not provable from A.[37]   While the use of the

undefined term 'not provable' can be understood as narrowing the concept

of a complete deductive system to a system affording demonstrative

provability, as in the example he gave:

> Hence, if we conceive this limiting-case as an instance of
> provability in a complete system, we may take P[not-B, A]
> = 0 to state that not-B is not provable from A; and, in
> general, the probability of B on A should be expected to
> vary inversely with the probability of not-B on A.   For
> we cannot, in such a complete system, assert anything about
> the non-probability or non-provability of B except in terms
> that imply asserting something about the probability or
> provability of not-B.   What emerges is the familiar
> complementational principle for negation: P[B,A] = 1 -
> P[not-B,A].   Completeness, as a property of certain
> deductive systems, may thus be viewed as a limiting-case
> of probabilistic complementationality.[38]

(ii)   Negation in incomplete systems.   Mr. Cohen deduced from the

above argument two further arguments.   One of them is that incomplete

systems whose probabilistic analogue has much in common with Keynes[39]

'weight of evidence' have no complementational negation.   The second

argument is that the gradation of evidence for proving a proposition

B does not count as a gradation of the inferability or non-inferability

of not-B in the case of incomplete deductive systems and their

probabilistic analogues.[40]   Since the author seems to regard the second

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36.   Cohen, The Probable and the Provable, op.cit. p 34

37.   Id.

38.   Id.

39.   Ibid. p 36.

40.   Ibid. p 37.

argument as a corollary of the first argument, while it is not, and did not explain each of them separately, I shall try to explain each of them separatetly by means of illustrations.

The first argument refers to a situation where both B and not-B are irrelevant under A.   If one may add another horrible example to those provided by Wesley Salmon one can provide a vivid illustration of Mr. Cohen's argument.[41]   Let us, for example, inquire as to what is the probability of getting an ace on a toss of a coin? In the light of our knowledge of the world the definite answer is zero.   Now let us further ask what is the probability of no ace on the same toss.   At first it may be thought to be one which, if true, would exclude our illustration.   This is possible only if we construe no ace to mean the absence of an ace on an outcome of a toss of a coin, and since that absence is a sure event then the probability would be one.   According to this reasoning what we negate is the concept of an ace or its non-occurrence.   However, when our referent is an entity other than an ace then the complement of no ace must be something other than an ace.   In that sense it may be any object you choose which is not an ace.   It may be determinable, as is usually the case, with reference to an inference rule which does not only determine the probability of an ace but the probability of no-ace.   If the meaning of the expression 'no-ace' is to be understood in this last context, then it should mean any card in a pack of cards other than an ace. The probability of no ace can therefore be seen to be zero.   Since A proves neither B nor not-B I shall refer to this situation as one of non-provability.   In this case the non-complementation principle holds: but only because A is irrelevant to both B and not-B.

According to the second argument the gradation of the inferability of B in an incomplete system depends on the amount of evidence in favour of B.   The positive evidence which entitles us to infer B does not provide inferability for not-B.   Acccordingly the inferability of

41.   See Statistical Explanation and Statistical

not-B is possible only on positive evidence favouring that conclusion.

> Only if the evidence were, on balance, in favour of not-B,
> would we instead, by grading the amount of relevant evidence
> we have, obtain a positive gradation of inferability for not-B.
> So, when we obtain a positive gradation of inferability for
> a proposition from possible evidence, we obtain none for its
> negation.   In other words,where the truth of A is not itself
> disprovable, if P[B,A] > 0, , then P[not-B, A] = 0.   But
> the converse does not hold -the negation principle is non-
> complementational - since A might be indecisive or wholly
> irrelevant in regard to B.   The evidence might neither favour
> B on balance nor not-B.   We should then have both P[B,A] = 0
> and P[not-B,A] = 0.   And this is like saying that in an
> incomplete deductive system it does not hold that, if not-B
> is not provable from A, then B is so provable, since it might
> be the case that neither B nor not-B is provable.[42]

It is clear from the above quotation that Cohen's second argument applies

to situations where his first argument holds (eg. where A might be

indecisive or wholly irrelevant in regard to B).   However, I think

that the second argument is capable of being applied to other contexts

as well, (ie. where both B and not-B are provable, but not-B is not a

determinate logical complement of B).   The point can be clarified

by contrasting the nature of complementationality in a complete system

with negation within incomplete systems.

>   C.   Inductive Probability

>   1. Its distinctive features

    Mr Cohen concluded from the argument in the previous discussion

that a concept of probability different from mathematical probability

exists.   He refers to such a concept as inductive or Baconian

probability.[43]   His concept has a different structure[44] from that of

mathematical probability and grades probabilities in a comparative

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42.   The Probable and the Provable, p. 37.

43.   Ibid. p 43, pp 121 et seq.

44.   Ibid. p 41, p 217 et seq.

or ordinal manner.[45]

> My point will be that alongside the various concepts of
> mathematical probability - i.e. the concepts which conform
> to the familiar principles of the mathematical calculus -
> there is at least one other kind of concept which has a
> rather different structure. This other kind of concept,
> which I shall call 'inductive probability', is not just
> a loose and popular form of mathematical probability.
> It differs from mathematical probability as a square
> differs from a circle rather than as a chalk - on -
> blackboard circle differs from a geometically perfect
> circle. For example, it has quite different principles
> for negation and conjunction. Moreover, it involves a
> comparative or ordinal gradation of probability rather
> than a quantitative and measurable one. So it lends
> itself particularly well to use in areas of reasoning
> where it is not possible to count or measure the evidence.[46]

a. Inference Rules: The inference rules for inductive probability

are universally quantified and suitably qualified conditionals.[47]

The quantification and qualification of these conditionals is the

function of his concept of inductive support.[48]   Inductive support

is obtained for a generalisation or a hypothesis by testing it with

proper controls under experimentally varied conditions any one of

which may operate unfavourably against the generalisation.[49]   The

support of a generalisation depends on the number and complexity

of the tests it passes without falsification, and the number of

qualifications in respect of those tests which it fails to pass.[50]

The concept of inductive support is itself a developed version of the

eliminative induction of Bacon and Mill.[51]   Though Mr. Cohen devoted

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45.   Ibid. pp 41, 122.

46.   Ibid. pp 40-41.

47.   Ibid. p 40, pp 202 et seq.

48.   Ibid. pp 129 et seq

49.   Ibid. ch. 13.

50.   Ibid. chs. 13 and 14.

51.   Ibid. pp 42 and 144 et seq.

a considerable part of his book to the grading of inductive support,[52] its logical syntax[53] and its relation to both inductive and mathematical probabilities,[54] yet the type of generalisations invoked in the law courts, according to Cohen, to warrant inferences are not the product of such rigorous techniques.   According to Cohen these common-place generalisations and their necessary qualifications are always part of the stock of knowledge of the fact-finder.

> The main commonplace generalizations themselves are for the most part too essential a part of our culture for there to be any serious disagreement about them.   They are learned from shared experiences, or taught by proverb, myth, legend, history, literature, drama, parental advice, and the mass media.[55]

Mr Cohen gave many examples of these rough generalisations together with some of the conditions which are either normal or abnormal for their application.[56]   It is sufficient, however, to give an example here.

> Perhaps a policeman swears, and defending counsel accepts, that the accused was found at 3 a.m. in the garden of a house which had just been burgled, and also that the stolen jewels where then in his pocket.   The conclusion proposed by the prosecution is that the accused was the burglar.   The rough generalization tacitly invoked as a licence for this inference might be that normally, if an object has been moved from its usual place and a man is found nearby immediately afterwards in possession of the object, then he deliberately removed it himself.   So the defence has to try to prove, in effect, that this generalization is inapplicable to the situation in question.   Perhaps, for example, the defence can produce testimony alleging that some other stranger also was in the garden immediately after the burglary and that the defendant merely picked up, with the intention of returning, what the other man had dropped.   Clearly the presence of one or more other people is one relevant variable for such generalizations as that tacitly invoked by the

52.   Ibid. ch. 13.

53.   Ibid. ch. 14.

54.   Ibid. ch. 15.

55.   Ibid. p 275.

56.   See for example, Ibid. pp 5, 19-20, 40, 122, 169, 248-251, 202-203.

prosecution.[57]

Since all rough generalizations are qualified in many respects, all that the evidence invoked by the generalisation assumes is that if all other conditions are normal then the generalisation applies.[58] It is open to the other party to prove any of the various other facts which are abnormal or unfavourable to the generalisation and tend to explain it away.[59] He can also establish another fact or facts which support a different conclusion from that proposed by his opponent under a generalisation which may be consistent with the facts proposed by his opponent, or by denying those facts altogether.[60]

b.   Formal Structures: It has already been mentioned that inductive probability differs basically from mathematical probability in certain important respects.   It is important to mention here some of the structural differences before discussing Cohen's legal arguments against mathematical probability.   The main relevant differences can be summarized as follows:[61]

(i)   The first difference relates to the scale properties of the two probabilities.   The gradation of inductive probability is ordinal or comparative, it cannot be quantified.   It is a scale which has no discrete degrees of quantification like the fixed numerical interval of the mathematical scale.   For example, the inductive probability of A on B may be equal to, greater than, or less than the inductive probability of A on not-B.   It follows from this property that

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57.   Ibid. p 248.

58.   Ibid. p 247.

59.   Id.

60.   Ibid. p 249.

61.   For other differences see ibid. pp 217-220.

the inductive probabilities cannot be quantified.[62]

(ii)   The negation principle for inductive probability is not complementational, i.e. if the inductive probability of H is greater than 0 then the inductive probability of not-H equals 0.   Cohen refers to the probability of H and no-H as their monadic probability. For conditional probabilities he used the term dyadic probabilities, i.e. if the inductive probability of H given E is greater than 0, then the inductive probability of not-H given E must equal 0.[63]

(iii)   The conjunction principle for inductive probability is not multiplicative, the monadic conjunction of two or more conjuncts equals the probability of either of them if they are equal or that of the less probable conjunct if they are not.   The same rule applies to dyadic probabilities, i.e. if the inductive probability of H_1 on E is equal or greater than the inductive probability of H_2 on E then the inductive probability of H_1 and H_2 on E is equal to the inductive probability of H_2 on E.[64]

Cohen argues further that his inductive probability faces none of the paradoxes which the application of mathematical probability to judicial proof generates.   Cohen's arguments in that regard are the subject of the next chapter.

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62. Ibid. pp 74 et seq; see alos pp 221 and 270.

63. Ibid. pp 58,61, 220-221, 265-268.

64. Ibid. p 221.

CHAPTER 6

Cohen's Legal Arguments Against Mathematical
Probability

A.   The Difficulties

We have already seen some of Cohen's objections against the
mathematical calculus as a formal structure for judicial proof.   In
what follows we shall consider five of the six paradoxes which he
claims that the mathematicist has to face.   The five difficulties
to be considered are ones about, conjunction, inference upon inference,
negation, proof beyond reasonable doubt, corroboration and convergence.
According to Mr Cohen the seriousness of his arguments against the
mathematical analysis of judicial probability is not only derived from
the number of these paradoxes but also 'from the accumulation of
at least six widely different paradoxes.'.[1]

1.   The difficulty about conjunction:

The first difficulty relates to the conjunction of co-ordinate
component issues in a civil suit.[2]   If, for example, a plaintiff
has to prove both the making of a contract and its breach, the standard
of proof in civil cases requires him to prove his overall case on the
balance of probabilities.   This means that the probability of the
case as a whole must be greater than that of his opponent.   On a
mathematical probability scale the balance of probability in favour of
a successful plaintiff must be more than .5.   On a mathematical
analysis, the objection proceeds, the plaintiff may fail to prove his
overall case on a balance of probability even when he succeeds in
proving each component issue on a balance of probability.   This is

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1. J. Cohen, The Probable and the Provable, p 117.

2. Ibid. pp. 58, et seq

so because of the multiplicative nature of the conjunction principle

for the mathematical probability.   If the plaintiff in the example

just given succeeds in proving each component issue at a .7 level

of probability the product of the two probabilities will still be

less than .5.   This problem worsens progressively with the increase

in the number of a party's component issues.

No similar problem arises for inductive probability because

the conjunction principle of that probability is not multiplicative.[3]

> The inductivist analysis, however, has no difficulty in
> dealing with complex civil cases.   Either the probabilities
> of the component elements are incommensurable, in which case
> no probability-value can plausibly be assigned to their
> conjunction and separate assignments to each must suffice.
> Or alternatively the conjunction principle for inductive
> probability gives a quite satisfactory and paradox-free
> result.   The conjunction of two or more propositions about
> the same category of subject-matter, ... has the same
> inductive probability on given evidence as each conjunct,
> if the conjuncts are equally probable on that evidence, or
> as the least probable of them, if they are not.[4]

This objection by Cohen is probably valid against certain

suggested uses of mathematical probability in which prior probabilities

are assigned to the ultimate legal conclusions justified by the

satisfaction, in a particular case, of the initial conditions for

the application of the substantive rule or rules which govern that

particular case for the purpose of conjoining and assessing values

of all relevant items of evidence to the legal conclusion.   This

type of analysis is objectionable because it assumes wrongly the

transitivity of each and every item of relevant evidence to that

conclusion.   In most types of legal case many items of relevant

evidence do not, as is fully explained in chapter 10   below, satisfy

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3.   Ibid. pp 265-266.

4.   Ibid. p 266.

the requirement of transitivity to the legal conclusion in question.
The analysis is also objectionable since it assumes incorrectly that
all component issues (i.e. ultimate facts in issue), are commensurable
and hence combinable in accordance with the multiplication rule for
mathematical probability.

Whilst most mathematicists seem to commit themselves to, and
defend, the type of analysis objected to by Cohen, it is however,
arguable that there are other possible mathematical uses to which his
objection does not apply.   One argument is that prior probability
must only be assigned to a conclusion if and only if the requirement
of transitivity between the relevant value in question and that
conclusion is satisfied.   However this argument is open to the
criticism in part III, i.e. that the test of relevancy does not ensure
in all cases a proper test of transitivity.   The other argument which
is acceptable to Cohen is that component issues (facts in issue) are
not combinable on account of their incommensurability;   they are in
most cases distinct and independent requirements which must all be
individually established as true or highly probable if the substantive
legal rule prescribing them is to be applicable in the particular
inquiry involving them.   In other words their 'combined' existence
consists in their conjugation together rather than the multiplication
of their individual numerical probabilities.

I agree with Cohen's result that the multiplication of the
values of component issues in judicial proof is inappropriate, and
that the uses of the mathematical analysis he criticised are not fit
for the analysis of evidence in judicial contexts.   Having said that,
I would like to state that while his solution scored a point against
the specific uses of mathematical analysis he considered, it has no
significance for judicial fact finding.   The reason for their non-

combinability is simple.   They are the initial conditions for the

requirement of the applicability of a substantive legal rule which

should not be satisfied unless each component issue is individually

established as true or highly probable.   It follows from this, and

from Cohen's argument about the incommensurability of component issues

in judicial inquiries, that component issues when proved to exist pose

no problem for the fact-finder.   It is true that they should be further

'combined' for the purpose of satisfying the requirements of the

applicability of the legal rule for which they are the necessary initial

conditions, but they are combined in the sense of being ascertained,

and not in the mathematical sense of being multiplied.   The genuine

problems that fact finding poses in judicial inquiries relate to the

determination of various significant issues connected with evidentiary

facts and reports about them;   whether they can be used to support

inferences as stated or only when validated by the fact-finder;

whether all validated evidence reports are probative to the spatio-

temporal contexts of the issues involved in a judicial trial;

whether some of them may be probative while others are not;   and if

it is true that not all relevant evidence is necessarily transitive

to the issues to which it is related, then what criteria aid the

fact-finder in determining which items are probable and which are not?

It is submitted that Cohen's account is silent on the most

important issues which confront a judicial fact-finder in real

situations.   He also made a very weak case for the uses of mathema-

tical probability by concentrating on obviously inappropriate uses of

mathematical analysis to criticize the use of the theory as a whole.

It is unfortunate that most of his opponents chose to defend the uses

he attacked as if they were legitimate uses of mathematical analysis

of which judicial proof is susceptible.[5]   For example, Professor

Glanville Williams has this to say about it

> It seems obvious that common sense must be accepted and
> that the proof should be regarded as sufficient. We have
> to choose between two solutions, each of which involves
> an element of paradox: that the plaintiff fails on the
> case as a whole, although he has succeeded on each issue,
> or that he succeeds on the case as a whole, although he
> has not proved the case as a whole on the balance of
> probability, whereas the legal rule seems to require
> this. The legal rule must be modified, that's all.
> The Plaintiff need only give the necessary quantum of
> proof in respect of each issue. Were it otherwise,
> a defendant could assist himself by multiplying the
> issues and submitting that if some issues are proved
> against him to a degree falling short of certainty by
> as little as 0.05, the deficiency must operate by
> multiplication to reduce the probability of the plaintiff's
> case overall. ...Similarly, in a criminal case it is
> enough if each issue is proved against the defendant
> beyond reasonable doubt.[6]

It is also urged against Cohen that in some cases the component

issues are not independent, and that to those cases the multiplication

rule for mathematical probability does not apply.[7]   The formal

structure for A and B which are dependent has to consider both the

probability of A and the probability of B given A.

2.   The difficulty about inference upon inference.[8]

A second difficulty relates to what Wigmore long ago termed

catenated inference and has recently been referred to as cascaded

inference by Professor David Schum.[9]   An inference is catenated or

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5. See for example, R. Eggleston, 'The Probability Debate', op.cit pp 682-
683; G. Williams, 'The Mathematics of Proof - I - II' [1979] Crim. L.R.
pp 297 and 340 at 341 and 346; D. Schum, 'A Review of a Case Against
Blaise Pascal and his Heirs', op.cit p 480.

6. G. Williams, op.cit pp 340-341.

7. See for example, R. Eggleston, 'The Probability Debate' op.cit
pp 678-679, 681-684.

8. Cohen, The Probable and the Provable, op.cit pp 68-73

9. See Wigmore, Science of Judicial Proof, op.cit pp 13 et seq; see Schum,
'Review of a Case Against Blaise Pascal and his Heirs', op cit p 466.

cascaded when the evidence does not point directly to the conclusion and a 'chain' of inference is required to link the evidence with the conclusion. The issues of credibility, opportunity and motive are good examples of the type of evidence under consideration. For example the issue of motive in any criminal case involves at least three reasoning stages with each stage depending for its proof on the stage preceeding it. However since Mr Cohen made his objections specifically with reference to civil suits we shall confine our discussion to that area of litigation.[10] Such a proof according to Mr Cohen

> [C]ontains, say, a proof of R from Q and then a proof of S from R, rather than proofs of R and S directly from Q. For example, the testimony of a witnesses might establish a certain probability that A's finger infection was caused by accident, and perhaps this causation might in turn establish a certain probability that A's death was caused by accident. A question then arises about how high the probability must be at each stage of the proof - from Q to R and from R to S, respectively - if the conclusion S is to be established on the balance of probabilities.[11]

He argues that the multiplication rule for mathematical probability allows transitivity from Q to R and from Q and R to S while[12] 'the courts and textbooks do not normally accept transitivity of proof on the balance of probability.'.[13] The judgment of Lockwood, J. in New York Life Assurance Company v. McNeely, and its approval by Wigmore was cited as an authority for this rule.[14]

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10. J. Cohen, The Probable and the Provable, op.cit. p 267.

11. Ibid. p 69.

12. Id.

13. Id.

14. 79 pac. 2d 948 (1938); see Wigmore on Evidence, (1940) Vol. I, p 438; see now Tiller's (rev.) Vol. 1A (1983).

Mr Cohen's interpretation of this rule is that every stage prior to the final conclusion must be proved beyond reasonable doubt. Because 'a judicial proof on the balance of probability sets out to show that the ultimate derived conclusion is probable on known facts, not to show that it is knowable from probable facts.'[15] For Cohen both this rule and its requirement of intransitivity of proof on the balance of probability can be easily explained in terms of inductive probability. Each stage in a many-stage proof on the balance of probability requires an independent category of covering generalization to determine its inductive probability according to the support function of the generalization.[16]

This objection is closely related to Stephen's argument that for an inference from an evidentiary fact to be valid the existence of that fact must be proved or established at a high level of probability. This seems to be a sound argument which can support a valid objection to any inferential system which does not require, as a condition of a valid _inference_, the 'correspondence' of the evidence reports to the reality reported. Assuming, for the sake of argument, that the reasoning process in judicial fact finding is inferential, atomistic and sequential, then, the following conditions must be satisfied for an inference to be valid; the facts which form the basic empirical warrant for the inference must be established (as 'found' to exist); the inference-rule or generalization from which the inference can be made on that 'established' empirical warrant must be sound. As has already been noted certain uses of mathematical analysis assume the transitivity of all relevant items of evidence to the ultimate legal conclusion. These uses violate the common sense

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15. See _The Probable and the Provable_, _op.cit_ p 269.

16. _Ibid_. p 268.

requirement of establishing the facts on which the inference is
based. Cohen, however, used transitivity in a very narrow sense
by confining it to a legal requirement which he attempts to support
by citing legal authorities and made the validity of an otherwise
sound common sense requirement dependent on the existence or absence
of legal decisions supporting or undermining it. Again Cohen did
not use the argument in question against the uses of mathematical
analysis which assume the transitivity of all relevant evidence
to the final legal conclusion on the 'whole evidence'. One can
not resist the impression that Cohen's main concern was to score
points against the use of mathematical analysis on the assumption
that judicial fact finding, which he assumes to involve an atomistic
inferential reasoning process, uses either mathematical or inductive
analytical structures, and that once the mathematical structures are
assailed the inductive structures should rein.

It is interesting to note that while Cohen's attack on the
uses of mathematical analysis in relation to inference upon inference
is based on a claim that such analysis tends to disregard the requirement
of a sufficient empirical warrant for the chain of inference and
hence assumes the transitivity of proof on a balance of probability
where more than one stage of proof is involved, his suggested
solution is not related to these premisses. It is based, instead,
on the claim that inductive probability has a structure different
from that of mathematical probability where proof on the balance of
probability can not be assumed to be transitive.

> But, if the standards of judicial proof are interpreted in
> terms of inductive probability, a reason is immediately
> apparent why proof on the balance of probability cannot
> be assumed to be transitive. More than one stage of proof
> would not be needed if more than one type of connection
> were not involved. But, if more than one type of connection
> is involved, more than one category of covering generalization
> determines the inductive probabilities. A different inductive
> support-function is therefore applicable to the covering

generalization for each stage; and, as different support-functions are incommensurable with one another except in respect of their limiting values ... so too are the probability-functions they generate[17]

Even if it is accepted that the inductive solution offered by Cohen avoids the difficulties generated by mathematical analysis, it can be seen that the resultant inductive analysis is atomistic and inferential. Since covering generalization can be used to make single inference only, the integration of these inferences into a consistent whole seems to pose a problem for the inductive probability. This is more so when it is realized that no complex covering generalization under which more than one single inference can be subsumed is available.

Cohen's critics pointed out that the authorities cited by him are not universally accepted and[18] that there is no <u>authority</u> for his claim that in a many-stage proof each stage must be established beyond reasonable doubt.[19]

Another objection raised against his analysis is that it does not include all the necessary probabilistic ingredients of the issues, ie. likelihood ratios.[20]

3.   <u>The difficulty about negation</u>

This difficulty relates to the operation of the negation principle on the interpretation of the standards of proof in civil cases. The negation principle for mathematical probability is complementational, ie. probability X equals one minus probability

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17. <u>Id</u>.

18. See for example, R. Eggleston, 'The Probability Debate', <u>op.cit</u>. p 683; <u>Evidence, Proof and Probability</u>, (2nd ed.), pp 39 <u>et seq</u>.

19. R. Eggleston, 'The Probability Debate', op.cit. pp 682-683, <u>Evidence, Proof and Probability</u>; (2nd ed.) <u>op.cit</u>. pp 39 <u>et seq</u>. and appendix II.

20. D. Schum, 'Review of a Case Against Blaise Pascal and his Heirs', <u>op.cit</u>. p 476.

not-X.   If for example the standard of proof in a civil case is interpreted to be .501 then a party may lose while his case may be as high as .499.   The difficulty involved here is that 'the probability that the unsuccessful litigant deserved to succeed may be by no means negligible'.[21]   To illustrate the injustice of this rule Mr. Cohen devised what he termed the paradox of the gatecrasher.   It is[22]

> Consider, for example, a case in which it is common
> ground that 499 people paid for admission to a rodeo,
> and that 1,000 are counted on the seats, of whom A is
> one.   Suppose no tickets were issued and there can be
> no testimony as to whether A paid for admission or climbed
> over the fence.   So by any plausible criterion of
> mathematical probability there is a .501 probability, on
> the admitted facts, that he did not pay.   The mathematicist
> theory would apparently imply that in such circumstances
> the rodeo organizers are entitled to judgment against A
> for the admission-money, since the balance of probability
> (and also the difference between prior and posterior
> probabilities) would lie in their favour.   But it seems
> manifestly unjust that A should lose his case when there
> is an agreed mathematical probability of as high as .499
> that he in fact paid for admission.[23]

The objection that the difficulty may be superseded by raising the threshold of proof in civil cases to a level much higher than .501 was considered by Cohen and rejected.   The reasons given for that rejection were as follows:[24]

I.   It will worsen the difficulties about conjunction.

II.   A higher level is incompatible with the meaning of the phrase

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21.   Ibid. p 75.

22.   Id.; for further discussion of this and other similar paradoxes see D. Kaye, 'the Paradox of the Gatecrasher and other stories' [1979] Ariz. St.L.J. 101; - Nesson, 'Reasonable Doubt and Permissive Inferences: The Value of Complexity', (1979), 92 Harv. L. Rev. 1187; L. J. Cohen, 'Subjective Probability and the paradox of The Gatecrasher', [1981], Ariz. St. L. J. 627.

23.   The Probable and the Provable, p 75.

24.   Ibid. p 76.

'the balance of probabilities'. And if it is high enough it will cause the difference between the standard in civil cases and in criminal cases to disappear altogether.[25]

III. '[E]ven if the threshold is put as high as a mathematical probability of .8, this still seems to represent a scandalously high level of admissible doubt for a legal system to endorse de jure.'[26]

The inductive probability meets no such difficulty because its negation is not complementational.[27] If the probability of a proposition is greater than zero then the probability of its negation must be zero. This means

> On the inductivist interpretation litigants take part in
> a contest of case weight, as befits the Anglo-American
> adversary system of procedure, rather than in the division
> of a determinate quantity of case merit. The plaintiff
> may win by a greater or lesser margin, but if he wins on
> all the facts in court the defendant just loses. Hence
> no injustice is officially countenanced by allowing proof
> on the balance of probability.[28]

The inductivist analysis solved the paradox of the gatecrasher by saying that there is no specific evidence against him which evidence is necessary to bring him under an inductively supported generalization.[29] The difficulty about negation is one of the most criticised arguments of Mr. Cohen, especially by those of his critics who deny his claim that an inductive probability exists alongside and independently of mathematical probability on the assumption that all probabilities are mathematical.[30]

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25. Id.

26. Ibid. pp 76-77.

27. Ibid. p 270.

28. Id.

29. Ibid. p 271.

30. G. Williams, op.cit. p 297 and p 340.

The objection involves a policy argument similar to that
advanced by Professor Tribe against the use of mathematical analysis.[31]
When numerical values are assigned to a proposition and its negation
the requirement of proof on a balance of probability can be satisfied
at the level of .501. This means that a party who has a .499
probability in his favour will lose. It follows, according to Cohen, that the
legal system which employs the probability for the analysis of
evidence officially countenance injustice. Neither the objection
nor the suggested inductive solution, which tries to avoid the
difficulty by proposing a probability system which does not quantify
a probability, and its negation is not complementational (i.e. when
$P(A) > 0$, $P(-A) = 0$), is related to the judicial fact finding task
in a legal context. However the crucial question for both
probability systems is whether the atomistic and inferential
analysis they employ is appropriate in judicial fact finding
processes? This question is dealt with in part III of this thesis.

As far as the gatecrasher paradox is concerned its analysis
by Cohen attributes to the mathematicists a tendency to treat
every item of statistical evidence as relevant irrespective of the
issues involved. Cohen's own analysis of the situation concludes
that the statistical evidence in that paradox is not relevant.
It is not at all clear why it should be relevant for the mathematicists
and irrelevant for the inductivist. There is one concept of
relevancy in law and any item of evidence which does not satisfy the
test of relevancy is excluded. However since some of Cohen's
opponents regard the statistical evidence in the gatecrasher to be
relevant it is important to go at some length into those arguments.
Cohen claims, not without justification, that his main thesis was

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31. L. H. Tribe, 'Trial by Mathematics: Precision and Ritual in the
Legal Process', (1971), 84. Harv. L. Rev., p. 1329.

either misrepresented or misconceived.[32]   A criticism advanced by

Professor Glanville Williams in general, and against the negation

argument in particular is a case in point.   Professor Williams

seems to conceive the basic thesis of Mr Cohen as a thesis against

numerical quantification or the fixing of the threshold of the

civil standard at a level as low as .51 or even .501.   His

argument that the raising of the standard to a level much higher

than .51 would cause injustice to plaintiffs is not an answer to

any of Cohen's objections.[33]   It is the argument of Cohen that if

judicial proof were a function of mathematical probability then .51

or even .501 could be its proper threshold.   He never considered

its raising above that level as a proper solution of the problem.

In fact he viewed the raising of the level as generating more

problems than solving the problem he posed.[34]   He found the

condonation of injustice by the system accepting mathematical

principles, whether the injustice is to plaintiffs or defendants,

quite objectionable.[35]   For this reason, and because the mathematical

principle generates other problems which are equally serious he

proposed an alternative system which he claims to be paradox free.[36]

Again it is not an answer to Cohen's argument to say, as Professor

Williams said:

> Whatever our principles of proof are, they are bound to
> produce a certain probability of a miscarriage of justice

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32.   See 'Logic of Proof' [1980], Crim.L.R. pp 91, 94 and, 'The Problems
of Prior Probabilities in Forensic Proof', op.cit.

33.   G. Williams, op.cit. p 303.

34   The Probable and the Provable, op.cit. pp 76-77.

35.   Ibid. p 76; see also 'The Logic of Proof' op.cit. pp 98-99.

36.   The Probable and the Provable, op.cit. pp 244 et seq., pp 265
et seq.

which might be different if the rules were different.
It is a fallacy to suppose that by abandoning the notion
of numerical probability for legal proof we escape having
to consider whether we prefer to have a miscarriage of
justice in a possibly wrong judgment for the plaintiff or
a miscarriage of justice in a possibly wrong judgment for
the defendant.   That problem will always be with us.[37]

As regard the paradox of the gatecrashers Professor Williams concedes

that the statistical evidence is inadmissible against the defendant

since 'it does not sufficiently mark out the defendant from others.'.[38]

His justification of this rule is that   'our sense of justice

requires evidence to be given singling out the defendant from other

possible culprits.   This requirement that evidence should focus on

the defendant must be taken to be a rule of law relating to proof,

distinct from the general rule governing quantum of proof.'.[39]

This view of Professor Williams, as we shall shortly see, has been

criticised by Sir Richard Eggleston who seems to interpret the concept

of the standard of proof in an extremely restrictive manner (eg. as

a mathematical standard of 'more probable than not') which is

sufficient to sustain the plaintiff's burden of proof.[40]   He argued

that Mr Cohen applied the concept wrongly because he failed to

distinguish between two classes of case.   The first class of case

arises when the task of the court is 'to decide whether the case

made for the plaintiff is sufficient to sustain his burden of proof,

the defendant either having called no evidence, or having submitted

that there is no case to answer.'.[41]   The other class of case arises

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37. 'The Mathematics of Proof' op.cit. pp 303-304.

38. Ibid. p 305.

39. Id.

40. 'The Probability Debate' op.cit. p 678

41. Ibid. p 678.

when the defendant enters upon his defence and calls evidence in rebuttal. He stated that Mr Cohen's description is apposite in the latter kind of case, not the former and concluded

> But this approach is only appropriate when the defendant seeks to prove an alternative version of the facts. When he cannot do so, or rests on the weakness of the plaintiff's case, the only test that the tribunal can apply is whether the plaintiff has made it appear 'more probable than not' that the facts are as he has alleged.[42]

If Sir Richard is ready, as he seems to be, to accept the proposition that the standard of proof is Baconian and not Pascalian when 'the parties are at issue',[43] I cannot see how he can take the standard to be Pascalian when the parties are not at issue. All that the Baconian's require is that if the probability of A is greater than zero then the probability of its negation must be zero. But it is possible, however, to argue that Sir Richard's distinction between the two classes of case is meant to show that Mr Cohen's objection has got nothing to do with the standard of proof. The following may be cited in support:

> In dealing with the standard of proof in civil cases, therefore, we are not normally concerned with those cases in which the defendant has gone into evidence; though even there, it is possible for the judge in the last resort to solve the problem of conflicting evidence by saying that he does not know which party to believe, and that the plaintiff, having the burden of establishing a balance of probability in his favour, must therefore fail. Where the standard of proof usually comes into play is in cases in which the defendant claims that the plaintiff's case has failed to come up to the required standard.[44]

The suggested interpretation is untenable for two reasons. First, it has the consequence of ruling out the existence of any standard

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42. _Ibid._ p 680.

43. _Id._

44. _Id._

of proof in all civil suits where parties take issue.   Second,

the interpretation is inconsistent with Sir Richard's reference

in the same passage to the belief of the court as a standard of

decision which is incompatible with his suggested mathematical

standard where the defendant calls no evidence in rebuttal.

Sir Richard's position on the paradox of the gatecrashers

is even more problematic.   He distinguishes between the

possibility of the plaintiff suing all the defendants jointly,

and that of suing them individually.[45]   The admissibility of the

statistical evidence, the extent of that admissibility, and its

probability to sustain the plaintiff's burden of proof is made to

depend on which of the two courses the plaintiff chooses to take.

When he sues all the defendants

> [T]he court will not dismiss any defendant from the case
> at the end of the plaintiff's evidence merely because
> there is at that stage no evidence against him.   If he
> sued the defendants individually, he could only raise
> a prima facie case against a defendant if he had not
> already recovered payment from two other defendants,
> since there would then be 499 payers out of 998.[46]

He considered this view to express the correct legal position and

for that reason he could not understand the rejection by Professor

Williams of the proposition;

> That a plaintiff could not even make a prima facie case
> by proving that the defendant was one of 1,000 people

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45. Ibid. p 681;   Evidence, Proof and Probability', (2nd ed.) op.cit
pp 40-42;   for the difficulties involved in dealing with statistical
evidence see, Sir D. Napley, 'Lawyers and Statisticians', (1982) 145
J.R. Statist. Soc. A. 422;   F. Downton 'Legal Probability and Statistics'
ibid. p 395;   D. Newell, 'The Role of the Statistician as an Expert
Witness', ibid p 403;   S. Fienberg and M. Straf, 'Statistical Assessments
as Evidence', ibid. p 410.

46. Id.

only 499 of whom had paid ... The view that the
evidence must in some way 'focus on the defendant'
is not in my view supported by the authorities, and
is in fact inconsistent with the practice of the
courts in cases in which the plaintiff knows that
one of several persons is liable, but does not know
which one.[47]

The argument advanced is that in so far as the statistical evidence

proves at 'a more probable than not' standard it is sufficient to

make a prima facie case against any randomly chosen defendant.[48]

Of course, he recognized a situation in which the seriousness of the

allegation demands a standard of proof higher than the 'more probable

than not' standard.[49] Accordingly he concluded

The injustice of the plaintiff recovering more than he
was owed would not in practice arise, and the injustice
which troubles Mr Cohen, of giving judgment against a
man whose case has a probability of 0.499 of being true,
exists in every case in which the plaintiff makes a
prima facie case on the balance of probability, and the
defendant, for one reason or another, is unable to rebut
it. It does not outweigh the injustice of refusing a
remedy in those cases in which the plaintiff has the
odds in his favour.[50]

The weakness of this argument is obvious. It makes the

admissibility of the statistical evidence depend upon factors

which are extraneous to its potential persuasive force, (i.e. the

number of defendants sued). While it is admissible and sufficient

if the plaintiff sues any two randomly chosen defendants, the

same evidence is inadmissible against any of the remaining 998

defendants, because it is not sufficient to meet 'the more probable

than not' standard. On the other hand if the plaintiff chooses to

sue all the defendants in one action and if we assume that all the

defendants join in a plea of no case to answer, then on Sir Richard's

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47. The Probability Debate' op cit. p 681.

48. Id.

49. Id.

50. Ibid. pp 681-682.

argument the plaintiff will recover against all of them. This is

so since the allegation against each defendant (i.e. that the

defendant belongs to a class of 1,000 spectators out of whom only

499 paid and therefore there is a probability of .51 that he did

not pay) is the same allegation which the plaintiff makes against

each and every other defendant. What makes any defendant liable

can equally make every other defendant liable. To limit liability

to 501 out of the 1,000 defendants requires a criterion of

selection other than the evidence and the standard of proof. The

statistical evidence is only relevant to show the ratio of one

class to another (e.g. those who pay to those who did not); and

for this reason it does not single out any one of the defendants

as a member of this or that class.

4.   The difficulty about proof beyond reasonable doubt

        The objection under consideration relates to the difficulty

of quantifying the standard of proof in criminal cases which

requires proof beyond reasonable doubt.[51]   One difficulty relates

to the fixing of the level the satisfaction of which indicates

the absence of reasonable doubt.   The other difficulty relates to

the inability of the mathematical probability to specify reasons

for doubt.[52]   The mathematical standard is satisfied when there is

some very high level of mathematical probability falling short of

certainty.   The mathematical account of the standard does not show

how high the standard is.   It also does not explain what amounts

to reasonable doubt.

> Even if a scale of mathematical probability were to be used
> for assessing how close a particular conclusion was to
> certainty, the crucial reason for doubting the conclusion
> would very often not be the fact that the probability was
> no higher than, say, .95, but rather the specific item
> in, or feature of, the evidence that prevented this

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51.   The Probable and the Provable, op.cit. pp 82 et seq.

52.   Ibid. p 83.

probability from rising any higher.[53]

Mr. Cohen argued that it is easy to express and explain the criminal standards of proof in terms of Baconian probability.

> What seems to be needed in practice for assessment of proof in a criminal trial is a list of the various points that all have to be established, and of the various let-outs that all have to be barred, in relation to each element in the crime, if guilt is to be proved beyond reasonable doubt. Wherever we have or assume such a list a scale of mathematical probability seems altogether otiose. The strength of the proof depends just on the extent to which the list has been covered.[54]

The inductivist analysis, he argued, shows clearly the dependence between reason for doubt and the absence of certainty. If the inductive probability of S given R is not maximal

> [T]his must be because the generalization under which the desired conclusion, S, is derivable from R has less than full inductive support. And this in turn implies that the generalization is not qualified in relation to every relevant variable in a way that ensures its avoiding falsification.[55]

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53. Id.

54. Id.; for statistical evidence see n. 45 above; See also J. Kaplan, 'Decision Theory and the Fact-finding process, (1968) 20 Stan. L. Rev. 1065; A. Cullison, 'Identification by probabilities and Trial by Arithmetic', (1969) 6 Hous. L. Rev. 471; M. O. Frankelstein and W. B. Fairley, 'A Bayesian Approach to Identification Evidence, (1970) 83 Harv. L. Rev. 498 and, 'A Comment on Trial by Mathematics', (1971) 84 Harv. L. Rev. 1801, and 'A Conversation about Collins, (1974) 41 U. Chi. L. Rev. 242; W. B. Fairley, 'Probabilistic Analysis of Identification evidence', (1973) 2 Jour. of Leg. Stud. 493; L. Tribe 'A Further Critique of Mathematical Proof', (1971) 84 Harv. L. Rev. 1810 and, 'Trial by Mathematics: Precision and Ritual in the Legal Process', ibid. p 1329: see D. W. Peterson (ed.) Statistical Inference on Litigation, (1983) 46 L.C.P. (Symposium).

55. Ibid. p 272.

It is generally conceded that proof beyond reasonable doubt can not be quantified in such a manner as to indicate the level at which it is reasonable to doubt, and that no mathematical scale can explain the reason for doubting a conclusion.[56]   However, some doubt has been expressed about the practicability of the inductive solution.   To quote the words of Professor David Schum 'I, for one, have difficulty imagining a situation in which all relevant points have been listed, let alone established in fact.'[57]   Cohen's inductive solution of the difficulty is based on assumptions which are difficult to justify in familiar contexts of judicial proof. It presupposes, for example the performance by the fact-finder of the whole fact finding task connected with relevant facts.   It assumes in addition the availability, in probably every trial, of a complete list of covering generalizations, each with its distinct support-function for the purpose of grading its inferential soundness.   It also assumes the competence of the fact-finder to perform all the cognitive functions involved in the fact finding task.[58]

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56.   See for example, R. Eggleston, 'The Probability Debate', op.cit p 679 and Evidence, Proof and Probability, (2nd ed.), op.cit. p 43;   D. Schum, 'A Review of a Case Against Blaise Pascal and his Heirs', op.cit. p 481;   G. Williams, op.cit pp 297, 305.

57.   D. Schum, 'A Review of a Case Against Blaise Pascal and his Heirs', op.cit. p 482.

58.   See for example, Cohen, The Probable and the Provable, pp 248, 275 and, 'Free Proof' in W. Twining (ed.), Facts in Law. (1983), p 1.

5.   The Difficulty about corroboration and convergence:

The last difficulty mentioned by Mr. Cohen relates to
two patterns of argument under the British and American legal
systems.   One pattern deals with the mutual corroboration of
different witnesses testifying to the same fact, the other
to the convergence of two or more items of circumstantial
evidence to probabilify the same fact.[59]   When a witness
testifies to the fact that P, then that fact on its own would
do something to raise the probability that P.   If another
witness independently of the first testifies that P his
testimony would have some force to probabilify that P.
Subject to the requirement of mutual independence, their
combined effect should be substantially greater than that
of either testimony.   The requirement of independence is
given as

> [T]hat neither fact may be causally connected with
> the other (other than through the truth of what is
> testified).   If one witness has been told what
> to say by the other, or is influenced by what
> he hears him testify, or is involved in any
> other kind of collusion, there may be no genuine
> corroboration.[60]

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59.   The Probable and the Provable, op.cit. p 93.

60.   Ibid. p 94.

When the requirement of mutual independence is satisfied in the
case of two or more items of circumstantial evidence the combined
effect of such items should be greater than the effect of each
individual item.[61] The logical structure common to both
corroboration and convergence is given as follows

> If a conclusion, S, has its probability raised by each of
> two premises, R_1 and R_2, when these are considered
> separately, and R_2 is unconnected with R_1, unless through
> the truth of S, then the conjunction of R_1 and R_2 makes
> S more probable than does R_1 alone. But how is it
> possible to elucidate this familiar principle in terms
> of mathematical probability?[62]

On that assumption Cohen proceeded to consider mathematical formulas
which account for both patterns of argument. He considered two
suggested formulas which he rejected because they failed to take
into account prior probabilities.[63] However, he admitted that a
mathematical account of corroboration and convergence is possible
if prior probabilities are taken into account.[64] The conditions
under which the mathematical analysis admits prior probabilities
are, according to Cohen, 'never legitimately obtainable in criminal
courts of the English and American legal systems...'.[65] In what
follows I shall consider the two formulas treated by Mr. Cohen and
his criticism of them; his objection against prior probabilities;
his inductivist solution of the difficulties; and, finally what

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61. Id.

62. Ibid. p 95; but see R. Eggleston 'The Probability Debate', op.cit.
p 679.

63. The Probable and the Provable, op.cit. pp 95 and 99.

64. Ibid. pp 98, 101 and 278.

65. Ibid. p 107.

his critics have objected against his account.

(a)   The traditional formula.   Mr. Cohen considered first a

formula which he attributed to Bernouilli, quoting its exposition

by George Boole as follows:[66]

> Let $\underline{p}$ be the general probability that A speaks truth,
> $\underline{q}$ the general probability that B speaks truth; it is
> required to find the probability, that if they agree in
> a statement they both speak truth.   Now, agreement in
> the same statement implies that they either both speak
> truth, the probability of which before-hand is $\underline{pq}$,
> or that they both speak falsehood, the probability of
> which beforehand is $(1 - \underline{p})$ $(1 - \underline{q})$.   Hence the
> probability beforehand that they will agree is $\underline{pq}$ +
> $(1 - \underline{p})$ $(1 - \underline{q})$ and the probability that if they agree
> they will agree in speaking the truth is accordingly
> expressed by the formula[67]

$$w = \frac{pq}{pq + (1 - \underline{p})(1 - \underline{q})}$$

To explain this formula I shall assign numerical values to both

p and q and then work out the solution of the equation.   If we

assign p a value of .7 and q a value of .6 then we have pq = .7 x .6

= .42 which stands for the probability of their agreement when they

are telling the truth.   Their agreement in telling a falsehood is

represented by $(1 - .7)$ $(1 - .6)$ = $(.3$ x $.4)$.   The equation works

out in figures as follows

$$w = \frac{.7 \times .6}{.7 \times .6 + (.3) \times (.4)} = \frac{.42}{.54}$$

which is roughly equal to .77.

Mr. Cohen argues that the traditional formula is limited to

situations where both p and q are independent of one another and

66.   Ibid. p 95.

67.   See G. Boole, Studies in Logic and Probability (1952) p 364

161.

they have a probability value greater than .5.[68]   When they are

dependent, or their probability is less than .5 their combined

probability becomes substantially less.   Accordingly:

> [O]ne common type of testimonial corroboration, or
> convergence of circumstantial evidence, is not
> elucidatable in this way.   One witness, for example,
> may seem rather unreliable because of his shifty
> demeanour, and another may seem rather unreliable
> because of his bad eyesight.   Yet perhaps, quite
> independently, they both testify to precisely the
> same set of propositions even though each could have
> told any number of other stories.   In such a case
> Boole's formula produces a lower probability for their
> joint veracity, whereas normal juries would assign a
> higher one.[69]

He argued further that the formula is limited to binary domains,

and it does not take into account prior probabilities.[70]

(b)   The Ekelof formula.   The other formula considered by Cohen[71]

is a formula suggested by Ekelof in 1964.[72]   The terms of the

formula and its proposed solution are contained in the following

passage:

> Let us suppose that in an action concerning a highway
> accident there are two facts tending to prove that one
> of the cars concerned had a speed exceeding 60 m.p.h.;
> length of the braking marks, and a witness who observed
> the collision.   We further make the unrealistic
> assumption that by examining a great number of similar
> situations it has been possible to ascertain that each
> of these evidentiary facts implies in 3 cases out of 4
> a faithful description of reality, whereas in the fourth
> case it has no value whatever as evidence of the speed
> of the car.   At least if the value of each evidentiary
> fact is independent of that of the other, the value [sc.
> of the combined evidence] must be greater than 3/4.
> But how much greater?   The length of the braking marks
> proves that the speed exceeded 60 m.p.h. in 12 out of

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68. **The Probable and the Provable**, op.cit p 96.

69. **Id**.

70. **Ibid** p 97.

71. **Ibid**. p 99.

72. 'Free Evaluation of Evidence', (1964) 8 Scandinavian Studies in
Law, p 47.

> 16 similar cases; at the same time this is proved by
> the witness-statement in 3 out of 4 remaining cases.
> The convincing force of the combined evidentiary facts
> would thus be 15/16.[73]

Ekelof himself did not show the manner in which the calculation

of his final figure of 15/16 is reached. Martin Edman expressed

the opinion that the figure is reached according to the following

formula[74]

$$w = p + q - (pq)$$

Cohen adopted Edman's view and proceeded accordingly to criticize

Ekelof's principle. The main criticism advanced against that

principle is that it did not take into account the necessary prior

probabilities. To illustrate this point Cohen gave the following

example

> Consider a case where p is .25 and is the mathematical
> probability that the criminal was a male on the evidence
> that he had long hair, and q is .25 and is the probability
> that the criminal was a male on the evidence of testimony
> to that effect by a supporter of the women's liberation
> movement. By Ekelof's principle these two evidential
> facts converge to give an increased value to the combined
> evidence of .44. Yet if the mathematical probability
> that the criminal was a male, on each separate piece of
> evidence, is .25, the probability that the criminal was a
> female is .75, and so the combined evidence has a force
> of .94 in favour of the conclusion that the criminal was
> a female. we thus have the paradox that, according to
> Ekelof's principle, the two pieces of evidence converge
> in opposite directions at the same time. Or - to put
> the point in other words - the evidence of the witness,
> on Ekelof's view, corroborates whichever conclusion you
> prefer to draw from the fact that the criminal had long
> hair; and evidence that purports to corroborate
> opposite conclusions does not in fact corroborate either.
> Moreover, if the force of the combined evidence is to
> be conceived of as a mathematical probability, we have a
> straightforward contradiction between the calculation
> that the probability of the criminal's being a male is

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73. _Ibid_. p 58.

74. 'Adding Independent Pieces of Evidence', in J. Hintika _et al_.(eds.),
_Modality, Morality and Other Problems of Sense and Nonsense: Essay
Dedicated to S. Hallden_, (1973), p 180.

.44 and the calculation that the probability of the criminal's being a female is .94, since presumably the probability of being a female is in fact the complement of the probability of being a male.[75]

(c) The legal inadmissibility of positive prior probabilities:

Cohen advanced two arguments against the admissibility of prior probabilities in judicial trials. The first is based on one of his arguments in relation to the difficulties about conjunction.[76] According to that argument if probative force is measured by the difference between prior and posterior probability, then a party could prove his overall case on the balance of probability when in fact he fails to prove one or more of his component points on its own.[77]

The second argument is based on an alleged legal rule which does not, according to Cohen, admit the use of prior probability against an accused person. The admissibility of prior probabilities is incompatible with the legal requirement that 'an accused person is to be judged only on the facts before the court. Hence he does not come into court with a certain positive prior probability of guilt.'.[78] On this view the mathematical analysis of judicial proof is impossible since 'if there is no positive probability of S, where S is the proposition that the accused committed the crime in question we have to suppose that the prior mathematical probability of not-S is 1; and, if that is the standing of not-S, no amount of evidence is going to alter it.'.[79] Cohen considered a number

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75. The Probable and the Provable, p 100.

76. Ibid. p 107.

77. Ibid. p 108

78. Id.

79. Id.

of escape routes for the mathematicist's account.[80]   He suggested

assigning prior probability to any item of evidence other than

the corroborating or converging premisses.   This would work well

in cases where there is other evidence than the converging or

corroborating items.   It does not work however when the only

evidence in the case is the corroborating or converging items.[81]

Apart from this

> There is no warrant for selecting one piece of evidence
> to determine   a base-point, or prior probability, by
> reference to which the probability-raising capacities of
> other evidential items are to be judged.   Nor are there
> any recognized procedures whereby prosecuting or defending
> lawyers may justify, or juries may appraise, the selection
> of one piece of evidence rather than another for this
> purpose.[82]

The suggestion of an infinitesimally small prior probability was

rejected because there is no method for calculating it, and because

of its incompatibility with legal tradition, and the serious

difficulties which it creates for the rational analysis of judicial

proof.   These difficulties are:

(i)   The evidence for the defence must attain a very high level of

probability in order to counteract the prior probability of guilt.

As a consequence this renders 'the task of defending accused persons

unconscionably tough.'.[83]

(ii)   When two accused persons, one male the other female, are

jointly tried and one of them must have committed the offence it

is not possible to assign 'an infinitesimally small prior probability

not only to the proposition that the assailant was in fact a male

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80.   Ibid. pp 109, 115.

81.   Ibid. p 109.

82.   Id.

83.   Ibid. p 113.

but also to the proposition that the assailant was in fact a female ...'.[84]

The solution of the difficulties provided by inductive probability is that if R_1 had probative value to probabilify S, and R_2 has also some value towards S, they converge or corroborate each other if and only if R_1 and R_2 are two independent relevant variables. Accordingly

> It follows that corroboration and convergence are completely intelligible within the theory of inductive probability. They are just two different ways in which inductive probabilities are raised by the favourableness of relevant circumstances, and the independence conditions that are necessary for corroboration and convergence flow from necessary constraints on the method of relevant variables – the characteristic method of assessing inductive support and inductive probability.[85]

This objection is valid if and only if the case Cohen made for the mathematical analysis is the only possible one. If, however, the mathematical analysis, like Cohen's inductive analysis, presupposes a process of selection which reduces the totality of evidence to a subclass consisting of genuine and probative items, then the use of mathematical analysis to that selected subclass of the whole relevant evidence is not affected by his objection. In that case the assignment of a prior probability does not create a problem since the assignment of prior probability and the analysis based on it takes place when the fact-finding process is over, the determination of issues such as the correspondence or lack of correspondence of evidence to the reality it reports, its proving force in the particular circumstances of the case, form no part of the mathematical analysis. But, this view limits the role of the use of mathematical analysis to the justification

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84. Id.

85. Ibid. p 280.

of 'given' judicial decisions and thus has no claim to the
assistance of any fact-finder to reach a rational decision.
In short, it provides a formal structure for testing the
'mathematical consistency' of a 'given' decision on a 'given'
validated body of evidence. The proposed role for mathematical
analysis of judicial proof is not in any way inferior to the
suggested inductive role. Cohen cannot object to it since
his inductive probability assumes exactly what is assumed here
and has no serious claim to more than a formal justificatory
role.

6.   The objections made against the last argument of Mr
Cohen by his critics can be listed as follows:

I.   That his mathematical formulations are incomplete;[86] he
failed to mention Bayes' theorem,[87] and his use of the traditional
formula and Ekelof's formula was wrong.[88]

II.   Prior probabilities are not excluded by any legal standards.[89]

III.   His reductio ad absurdum discussion of the mathematical
process which represents it as sequential or atomistic is
inconsistent with legal practice.[90]

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86.   See D. Schum, 'A Review of a Case Against Blaise Pascal and
his Heirs', op.cit. p 476.

87. G. Williams, op.cit p 346.

88. R. Eggleston, 'The Probability Debate', op.cit p 685 and, Evidence,
Proof and Probability, (2nd ed.) pp 203-207; G. Williams, op.cit.
p 343 and, 'A Short Rejoinder' [1979] Crim.L.R. p 107; see also,
C. M. G. Ockelton, op.cit. p 61.

89. See c. M. G. Ockelton, op.cit. p 68.

90. Ibid. p 64 et seq.; but see J. Cohen 'The Problems of Prior
Probabilities in 'Forensic Proof', op.cit. p 71.

These objections are dealt with at different parts of this thesis.[91]
It is for this reason that I shall consider briefly the first two objections
which can be dealt with together.   The first objection relates to Cohen's
failure to discuss likelihood ratios.   The omission of a discussion of
liklihood ratios, according to David Schum, misrepresented the role of
mathematical probability because '[c]ertain features of the PM system
are not evident unless formalizations involving probative weight are
expressed in this fashion.'.[92]   Since the determination of an initial
prior probability is essential for the calculation of liklihood ratios,
Cohen's argument against the admissibility of prior probabilities
in judicial trials may justify that omission.   The same argument
can also explain his failure to mention Bayes' theorem (Cohen
insists that he mentioned Bayes and G. Williams persists in rejecting
that claim).[93]

As to the two formulas used by Mr. Cohen it is generally
agreed that they are both defective and have an extremely restricted field
of possible application which is of purely academic interest.[94]   The
traditional formula is so restricted because (a) the independence between
the testimonies or items of circumstantial evidence which is necessary for
its application is hardly possible in practice, (b) it is designed for a
situation in which the only options are truth and falsity.[95]   While
Ekelof's formula met the requirement of independence, it is an imaginary

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91. See above Section A   and below chs. 8 and 10.

92. D. Schum 'A Review of a Case Against Blaise Pascal and his
Heirs', op.cit. p 477.

93. 'Logic of Proof', op.cit. p 100 (n. 20);   However, see his
'Bayesianism versus Baconianism in the Evaluation of Medical Diagnosis'
(1980), Brit. J. Phil. of Sci; p 45;   'The Mathematics of Proof'
op.cit. p 346 and, 'A Short rejoinder' op.cit. p 103 at p 107.

94. G. Williams, 'Mathematics of Proof', op.cit pp 344, 346.

95. See I. Hacking 'Combined Evidence', in S. Stenlund (ed.), Logical
Theory and Semantic Analysis (1974) p 113 at 122..

case which has no application in real life.   Glanville Williams

described   the limited validity and scope of the formula as

follows:

> Ekelof stated his argument in connection with a
> particular hypothetical case, and his words clearly
> show that he was assuming minimum, not fixed,
> probabilities - i.e. they were of the 'at least'
> form.   ('In the fourth case it has no value
> whatever as evidence of the speed of the car.').
> So limited, his principle was valid.   But, having
> correctly quoted from Ekelof, Cohen proceeds to
> assume that Ekelof's principle was meant to apply
> to fixed probabilities, and then has no difficulty
> in showing that it offends against the rule for
> negation, that the probability of the event and
> its complement must total 1.[96]

Both Professor Williams[97] and Sir Richard Eggleston[98] are of the

opinion that the appropriate method for combining the force of

different probabilities is Bayes' theorem.   However they

maintained the position that, since no quantities are available

from which probabilities could be calculated, the method suggested

is 'mainly useful to expose fallacies.'.[99]

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96.   G. Williams, 'Mathematics of Proof', op.cit. p 346.

97.   Ibid. p 346.

98.   R. Eggleston, 'The Probability Debate' op.cit. p 686 and,
Evidence. Proof and Probability, op.cit. pp 203-217

99.   R. Eggleston ibid. pp 687, 207; G. Williams, 'Mathematics of
Proof', op.cit. p 297.

PART III

THE HOLISTIC APPROACH

In Part I of this thesis I undertook an investigation of a hypothesis advanced by Professor William Twining to the effect that the Anglo-American scholars and theorists of evidence adopted a particular view of rationality which 'found its classical expression in English empirical philosophy in the writings of Bacon, Locke and John Stuart Mill.'.[1] The investigation was meant to ascertain the philosophical and intellectual sources of that tradition; and to provide an explanation for some of its basic characteristics and conceptual framework. My research in Parts I and II has confirmed Professor Twining's hypothesis in respect of the mainstream of that tradition (ie., the atomist). However, his thesis does not explain the thread of ideas which runs throughout the tradition and has its earliest expression in the writings of James Glassford in 1820. This thread has its intellectual sources basically in the Scottish commonsense philosophy and the philosophy of Thomas Reid and that of Dugald Stewart in particular. I refer to that approach as the holistic approach.[2] This part consists of four chapters. The first chapter considers the basic features of both atomism and holism and discusses some contexts in which the 'whole evidence' is used with non-holistic connotations. The second chapter treats a body of emerging thought which can not be properly classified as

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1. See 'The Rationalist Tradition of Evidence Scholarship', in E Campbell and L. Waller, (eds.), Well and Truly Tried (1982), p 211 at 234.

2. See below ch. 9.

either atomistic or holistic. This body of thought shall be treated under the title 'Emerging Holism'. In the third chapter the early beginnings of holism shall be traced to the writings of James Glassford and the Scottish School of Philosophy in general. Finally the last chapter shall contain the exposition of the holistic thesis and its proposed holistic analysis.

CHAPTER 7

Atomism and Holism

A.   Atomism

The atomistic approach inherited certain characteristic features from the empiricist philosophy. One of these characteristics is its atomistic and discursive analysis of evidence. According to that analysis each item of evidence is analysed individually and separately from the rest of the evidence: the analysis is represented as dealing with each item of the admitted evidence. These items are generally treated analogously to inter mediate proofs in a demonstration. The atomistic analysis is offered as an abstract tool to deal with the judicial fact finding task as a whole, without examining the nature of the task, or specifying the parts to which it can appropriately be applied. However, when the task of the judicial fact-finder is seen as involving two stages, the first stage confronts the fact-finder with the problems of reaching a judgment, while the second confronts him with the task of justifying that judgment, then the position of the atomist becomes really precarious and difficult. The problems which this distinction and the interaction between the two tasks generate renders the atomist position extremely difficult. One such problem relates to the question whether the analysis covers

both tasks, i.e., the pragmatic and the logical.   Some atomists, like David Schum, would give an affirmative answer to this question. For example David Schum's assumption that all relevant evidence has probative force, and his inclusion of all ingredients of relevant evidence which are admissible, according to the mathematical calculus, in his sequential calculation of the values of these ingredients, suggest that he treats the whole task as a logical one.[3]   The most obvious objection to this approach is that it confounds judgmental issues with issues concerned with justifcation.   The former consists in a discovery process which is a most problematic and complicated stage in a legal fact finding task that involves, in certain types of case, the determination of pragmatic and psychological issues which give that stage a definite formal structure for which, as we shall see, the atomistic approach does not account.   If, on the other hand, as recent views suggest, the analysis is confined to the justification of a judgment when its proofs have already been isolated from the whole evidence in the case, then its limited usefulness as a tool of analysis in relation to the judicial fact finding task can immediately be seen.

The neglect of the pragmatic problems of judicial proof, and the failure of most evidentiary scholars to consider the task involved in judicial proof from both the pragmatic and logical perspective has, in my view, resulted in a distorted notion of the nature of the judicial fact finding task.   The nature of the task, it is submitted, should be viewed in the light of the problems that face a fact-finder in the complexity of legal trials, which by necessity include the solution of pragmatic as well as logical

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3. See above ch. 1., n. 51.

problems.   The assumption that the judicial fact finding task is
probabilistic and inferential has been uncritically accepted, and
the need for its justification has not even been felt.   The recent
probability debates reinforce this assumption, and proceed,
therefore, to the analysis of a task already assumed to be probabilis-
tic and inferential.   An exposition of the main points of the debates
has already been given in Part II of this thesis.   In what follows
I will pose, and try to answer, the question whether the fact finding
and problem-solving task in legal trials is probabilistic at all, when
taking into consideration all the complexities which confront a fact-
finder in different types of case.   The answer to this question
determines whether the proper approach should be atomistic or
holistic.   However, before discussing the holistic approach to the
judicial fact finding task it is necessary for purposes of exposition
and completeness to restate in simple terms the main questions with
which the atomistic analysis deals.   Our reference to atomists has
so far been a general reference to an approach whose salient features
have already been given.   In the light of what has already been said,
an evidence   scholar would be an atomist whenever he approaches
the analysis or justification of the whole admitted evidence or
any part of it in a discursive and/or sequential manner, or who
while rejecting the discursive and sequential analysis of evidence
adopts a mathematicist position.   What emerges from this rough
test of atomism and atomists is that the atomistic approach
exists in differing degrees relative to the complexity of the
task to be analysed.   The following classification may be
conjoined with our rough generalization in order to illustrate
the concepts in question.   Let us refer to the whole admitted
evidence in trial (T) as (X) and to the fact-finder as (J).   The

atomists can be classified as follows:

1.   The Rationalist Scholars

According to most rationalist evidence   scholars each item of evidence should be estimated as it is introduced.   That estimation is subject to further revision when other items of evidence are received by J in T.   Most of the rationalist scholars presuppose unrealistically the credibility of witnesses in T. While experience in the form of common sense generalization is regarded as relevant for the determination of these values, the analysis does not go further than that.

2.   The Baconians

The Baconian thesis was meant to be an articulation of an implicit theme in (1) above.   Its main assumption, with which most lawyers would agree, is that judicial proof is not in principle a function of mathematical probability.   Even when the Baconian claim is granted, the Baconian thesis disregards the problems of the judgmental stage in judicial proof and deals mainly with the problems of justification of the grounds of that judgment. It does not point out any formal structure for the stage of judgment in judicial trial.   For this reason, it does not provide a method, or structure, for the isolation of those parts of X for which J seeks justification.   In that sense it presupposes the solution of all the pragmatic issues relating to X.   Apart from this, its attempts at justifying each item, whatever parts of X are finally isolated by J for justification independently of the other parts so isolated, is atomistic.

3.   The Pascalians

The Pascalians treat each and every item of X as a function of mathematical probability.   If, for example, X in T

consists of x_1, x_2, x_3, ..., X_n, then each item is assigned an individual value by J as the item is introduced in evidence. If for example J assigns .7 to items x_1 he must assign .3 to not-x_1 which is the complement or negation of x_1. The calculation of the value of an individual item of evidence may take into account various probabilistic ingredients, such as the credibility of the source of evidence and the probability of the event reported by that source. If the ultimate issue to be proved is Q and its negation is not Q, then the Pascalian would use a selected prior odds of Q to not-Q as a base for combining all X-items with that prior value. Subject to certain constraints all the values of X-items go into the calculation. The Pascalian position represents the most extreme view of atomism. It is based on the wrong assumption that each item of X, (being relevant and admissible), has probative force or evidentiary value. This tends to disregard or overlook the fact that X may, and in most cases it does, consist of inconsistent and contradictory assertions about facts. For this reason the Pascalian approach fails to see the distinction between relevance and probative force. It also fails to see the distinction between the existence or probability of evidentiary facts and their probative force, since it seems to assume all evidentiary facts to be probable. It also seems to view probative force as a function of individual items of evidence. In short, the atomistic approach in general, and its extreme Pascalian expression in particular, overlook many significant and real problems which confront J in most legal trials, and it fails to explain adequately the basic concepts of evidence, (e.g., relevance, probative force, evidentiary value, and sufficiency of evidence). One merit of the holistic approach to be considered next is that it has none of these

disadvantages.

B. Some Basic Holistic Features

One basic feature of holism is its rejection of the atomistic analysis of evidence not only on account of its atomicity but also because holism questions the adequacy of the epistemological and logical foundations of the evidence tradition adopting that analysis to provide for and capture the complexity of judicial fact finding inquiry.

Another feature of holism is its serious reflection on and questioning of the aptness and suitability of the emulation of scientific methods by traditional evidence scholarship. While it recognises the utility and importance of scientific methods and the contribution of the philosophy of science to jurisprudence, it detects significant differences between scientific and judicial inquiries. The emphasis by most evidence scholars on logical analysis, and hence the equation of the analysis of evidence with a justificatory and post discovery scientific paradigm, is misconceived. Judicial proof and evidence scholarship can gain a lot if the fact finding task is compared with the process of scientific discovery. This can be done without conceding the irrationality, illogicality or non-logicality of judicial fact finding inquiries. The assimilation of judicial inquiries to the invention of a new theory in natural sciences explains in a clear manner the role of experience (common sense generalizations) in such inquiries. The role of generalizations in relation to the task of the fact-finder is as limited as the role of any existing body of scientific knowledge to an inventor investigating any new hypothesis.

Holism accepts the fact that the trier of fact deals with probabilities and not certainties. However it maintains that the

logical impossibility of determining the existence of matters of fact
with certainty does not as a matter of necessity or practice preclude
the fact-finder from making a choice whereby he selects certain
facts as either true or probable on a purely conventional, if not
logical, basis.   The existence of such conventions and the practice
of resorting to them is an acceptable phenomenon in the philosophy
of science.[4]   For this reason holism does not subscribe to the
view that the logical impossibility of attaining certainty in the
determinations of the existence or non existence of facts, (whether
these facts be evidentiary or ultimate facts), justifies the claim
that no selection of true or highly probable facts is acceptable.
The alternative suggestion   to treat all evidentiary reports as
probable and probative, provides neither a rational nor a practical
solution to the problem.   For this reason the holistic approach,
unlike the probabilistic atomistic approach, stresses an important
distinction between the probability of facts and their probative
force.   This distinction adds a further complexity to the nature
of the task of judicial fact-finders, and calls for a restructuring
of the evidence within definite individual-spatio-temporal regions
for the determination of the truth of evidentiary reports.   The
relation of validated reports to the ultimate fact or facts to which
they relate also involves, in some cases, a further elimination of
true reports which have no actual probative value in the trial
context.   Finally the sufficiency of true and probative reports
to establish each and every ultimate fact necessary for drawing a
conclusion one way or another from the legal rule must be determined.
Holism provides a well structured method for the performance of all

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4. See below ch.10, Section B; see, for example K. Popper op. cit.
pp 37, 86.

these tasks.[5]

Another important feature of holism is its clear distinction between relevance and probative value not only with regard to single items of evidence (i.e. an item may be relevant yet fails to prove), but with regard to the total mass of received evidence. This involves a process of reduction of the volume and significance of the whole evidence. In this sense the 'whole evidence' is not identical with the totality of received evidence. It divides into different parts according to a spatio-temporal standard. Holism accords an important role to facts in the determination of these matters. Each individual spatio-temporal region constitutes an independent whole for the purpose of determining the probability or truth of the evidentiary fact or facts within that region. According to this view relevance provides a timeless standard for the reception of evidence while probative force demands the weighing of evidence within a temporal context. It is the sifting out of what is true and significant from the whole received evidence.

A basic feature of holism which cearly distinguishes it from any other theory of proof is its stringent demands regarding the transitivity of evidentiary reports vis a vis the co-ordinate ultimate facts and the legal conclusion drawn from conjoining them with the legal rule or rules. 'Some wholes' or parts of significant evidence are transitive only to one ultimate fact and intransitive to any other co-ordinate ultimate fact. If this point is valid then and for the same reasons the transitivity of any evidentiary fact to the legal conclusion is wholly unacceptable. Apart from this point the fact that the validity of the legal conclusion depends on the establishment of each and every ultimate fact necessary for

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5. See below, ch. 10, Sections A and C.

its drawing from the legal rule renders any single fact by itself, whether it be evidentiary or even ultimate, completely insignificant in relation to that conclusion. It follows from this that the practice of assigning prior probabilities to the legal conclusion by Bayesian theorists is not acceptable.[6]

    C. <u>Emerging Holism and some uses of the 'whole evidence'</u>.

Many references to the evidence as a whole and even 'holism' occur in a number of contexts for different explanatory and analytical pruposes. In most of these contexts the purpose behind the employment of such terms has nothing, or very little, in common with the concept of holism advanced in the present thesis. In very few references some common ground with one or more than one feature of holism can be discovered. However, even when such common grounds can be found they represent either a vague and unarticulated dissatisfaction with the traditional atomistic analysis of evidence, or, when dissatisfaction is consciously expressed and articulated against the atomistic analysis, it often arises from a vague aware- ness of what is wrong with the atomistic approach. It also fails to offer a well argued and properly structured alternative analysis. I shall consider these variants of holism under the heading 'Emerging Holism' in (1) below. The non-holistic uses of the 'whole evidence' is dealt with in (2) below.

1.   <u>Emerging holism</u>

Emerging holism is a general reference to a broad collection of remarks and opinions which are not always and in every case the result of a conscious or designed effort to criticise the existing traditional methods or provide an alternative to them. For this

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6.   See above, ch. 6.

reason it is important to attempt a rough and general classification of emerging holists into the following groupings;

(1) Those who adopt a mathematicist's strategy and while defending it express isolated remarks or opinions which are capable of holistic interpretations.

(2) Those who, without declaring their strategy, introduce conceptual tools or models for the analysis of evidence. The model of stories, the requirement of consistency and the theory of the case are such examples.

(3) Those who express their dissatisfaction with one feature or more of atomism, offer a critique of what they regard to be wrong with atomism, and try to provide an alternative method of analysis. One defect of this last category consists in its partial or distorted conception of what is wrong with atomism, and/or its failure to articulate an intelligible conception of holism, or a well-structured plan for holistic analysis.

2. The use of the term 'whole evidence' in contexts other than holistic contexts.

We have already mentioned the existence of various contexts in which the term 'whole evidence' is used without any holistic connotation. The contexts with which I am going to deal are not meant to be exhaustive. The substance of the topics referred to in the contexts to be considered are not relevant to this thesis. The examples are mere illustrations of some references which, for lack of explanation, may be mistaken for holistic references.

One familiar instance of such a reference is the direction

of the judge to the jury in his summing up to consider the whole

evidence in the case before they come to a decision.   Such direction

may be mistaken for an invitation to the jury to analyse the evidence

in a holistic manner.   However the general reference to the whole

evidence without more is not sufficient to indicate any of the

features of holism already stated.   If we take the object of the

direction it is too clear to admit of any equivocation.   Lord

Sankey in <u>Woolmington</u> v. <u>D.P.P.</u> stated it to be

> Throughout the web of the English Criminal Law one
> golden thread is always to be seen, that it is the
> duty of the prosecution to prove the prisoner's guilt...
> If, at the end of and on the whole of the case, there is a
> reasonable doubt, created by the evidence given by either
> the prosecution or the prisoner, as to whether the prisoner
> killed the deceased with a malicious intention, the
> prosecution has not made out the case and the prisoner is
> entitled to an acquittal.[7]

In this context the reference is meant to draw the attention of the

jury to the fact that the prisoner may benefit from evidence

introduced by the prosecution.   Reference to the whole evidence

also occurs in a similar situation where weak evidence for the

prosecution is significantly strengthened by evidence adduced by

the prisoner.   The rule involving such reference has been

explained by Sir Rupert Cross as follows

> In criminal cases tried with a jury, the accused is never
> put to his election whether to call evidence or not before
> a ruling is made on his submission that there is no case to
> answer.   If the ruling is in favour of the submission
> the jury are directed to acquit.   If the submission fails,
> the accused calls his evidence in the ordinary way.
> Contrary to what was once decided by the Court of Criminal
> Appeal, it has been said that on an appeal against
> conviction, the Court of Criminal Appeal considers the
> evidence as a whole, and they can therefore dismiss the
> appeal although they may be of opinion that the judge
> ought to have ruled that there was no case to answer
> at the close of the prosecution's evidence if, as

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7.   [1935] A.C. 462 at p 481.

sometimes happens, the accused is incriminated by his own evidence.[8]

Another context in which reference to the whole evidence occurred without connotating any holistic meaning is where direct evidence is contrasted with circumstantial evidence. The point of the contrast is meant to state that while a single credible item of direct evidence is sufficient to establish an ultimate fact, the sufficiency of items of circumstantial evidence normally requires a combination of a number of such items.[9]

Another context closely related to the context under discussion is that in which a party who relies on a number of items of circumstantial evidence fails to establish some of them. The argument that such failure breaks the chain and hence the effect of the evidence in which that item is a link was rejected in H.M. Adv. v. Humphreys where Lord Meadowbank directed the jury in the following terms:

> I must tell you that the Learned Counsel for the panel stated the law incorrectly when he said that you must have decisive, irrefragable, and conclusive proof of every point in a case like the present, before finding the instrument to be forged. The law is quite the reverse. You are to take all the evidence together, and you are bound to consider whether it amounts and comes up to affording a moral conviction in your minds equivalent to the positive and direct proof of a fact.[10]

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8. Cross on Evidence (5th ed., 1979), p 79.

9. See Wills, Circumstantial Evidence (1896, 1982) pp 300 et seq; See also ch. 2 above p

10. Swinton Rep. p 353, cited in Will, op.cit. p 361.

As a consequence the analogy of circumstantial proof to a chain was

seriously questioned:

> The effect of a body of circumstantial evidence is
> sometimes compared to that of a chain, but the metaphor
> is obviously inaccurate.   Circumstantial evidence is
> not to be considered as a chain and each piece of
> evidence as a link in the chain, for then if any one link
> broke the chain would fall.   A chain cannot be stronger
> than its weakest link, and hence, where the fact of
> guilt depends upon proof of a series   of links consti-
> tuting a chain, the absence of a single link will be as
> fatal to a conviction as the absence of all the links.
> But the simile of a chain and links can only be
> applicable where there is a series of facts, one
> succeeding the other, and each connected with and
> dependent upon the other.   There is no rule of law
> which prescribes any definite number of circumstances
> as necessary to the sufficiency of circumstantial
> proof.   There may be and there are cases where a
> single circumstance will justify the jury in finding
> the existence of an inferential fact.[11]

While the above rules contain no reference to any methods

of authenticating these items, or their evaluation as separate

items or wholes, their implicit recognition of the existence, in

practice, of a process of selection and elimination is important

for the holistic thesis.   The border-line rule between this category

and the emerging holism to be considered next is stated by Lord

Justice Ormrod in R. v. Bracewell.[12]   In that case the trial judge

directed the jury to consider the weight and value of medical

evidence in the light of the other evidence in the case.   The

defence considered this to be objectionable and appealed.   The

direction was approved by the Court of Criminal Appeal since

'[m]edical evidence is only a part of the material on which a jury

has to reach a decision and they must relate it to, and judge it

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11.   Will,   op.cit pp 464-5.

12.   (1979) 68 Crim. App. Rep. 44.

in the light of, all the other factual evidence in the case.'.[13]
The direction and the rule are justified in the light of the cautious
and guarded attitude of the expert witness who correctly expressed
a qualified opinion with no claims to certainty excluding any other
hypothesis. The obvious risk in such a case is that the attention
of the jury may be concentrated on that evidence in complete
isolation from the rest of the evidence. The jury may regard the
caution of the witness a good reason for the rejection of his
evidence. To invite the jury to consider the evidence in the light
of the rest of the evidence is to warn them against the danger of
allowing that item of evidence to determine the issues in the case.
The direction, of course, indicates neither the manner in which the
medical evidence may be related to the rest of the evidence in the
case nor what is meant by 'all the other judicial evidence in the
case'. Having said that, the restriction against the atomistic
evaluation of evidence supports one of the basic features of holism
already considered. This is why the case is seen as a borderline
case between this category and emerging holism which we shall now
consider.

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13. _Ibid_. at p 49.

CHAPTER 8

EMERGING HOLISM

Emerging holism [EH] is a general reference to a broad
collection of remarks and opinions which are not always and in
every case the result of a conscious or designed effort to criticise
the existing traditional methods or provide an alternative to them.
A general and rough classification of emerging holists has already
been given in Chapter 7.[1]   This chapter is an attempt to elaborate
and enlarge these general remarks.

A.   Mathematicism

Recent views have been expressed by some mathematicists in
defence of mathematical probability.   These views reject the atom-
istic analysis of certain types or categories of evidence.   The
views of these authors seem to be inconsistent with the position
which they choose to defend.   According to that position, it
is submitted, the only possible analysis is atomistic.   Insofar
as these views are not expressed as part of a comprehensive treatment
of the problems of the total mass of evidence in the different types
of case which usually confront fact-finders they can be read as
signs pointing in the direction of an alternative non-atomistic
approach.   For this reason I shall treat them as emerging holists.

This form of EH can be illustrated by examples from the
contributions of both Sir Richard Eggleston and Professor Glanville
Williams to the probability debates.   They both express the views
which commit them to the acceptance of an eliminative and selective

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1. See above ch. 7. p. 173.

process with regard to evidentiary facts.[2]   Similar views were

expressed by both Ekelof and Ian Hacking, well before the current

probability debates.[3]   In one of the most recent contributions

to the debate Mr. M. Ockelton seems to make an extremely damaging

admission on the part of the mathematicists when he wrote:

> The mathematicist sees the process of giving a verdict
> as a simple mapping function applied to whatever is the
> final value of g, the probability that the accused is
> guilty, after all the evidence has been considered.[4]

If this means, as it seems to suggest, that the trier of fact assigns

values only when he selects what constitutes proofs, the role of

mathematical probability, according to this view, is relegated to

that of analysing a foregone conclusion.[5]

Another feature of holism which finds support in this

category of EH is that which rejects atomistic analysis of evidence.

Ekelof's view is by far the most articulate in this respect.   His

view is that each individual item of evidence must be assessed

on the basis of the available evidence as a whole.[6]   Ekelof

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2. G. Williams, 'Mathematics of Proof 1-11'[1979] Crim. L.R. 292-
340 at 344-349 and, 'A Short Rejoinder' [1980] Crim. L.R. 103 at 104;
R. Eggleston, 'The Probability Debate' [1980] Crim. L.R. 678 at
and, Evidence, Proof and Probability (1977-1983) p. 38.

3. Per Olof Ekelof, 'Free Evaluation of Evidence' (1964) 8 Scandinavian
Studies of Law, p. 47 at p. 51; I. Hacking, 'Combined Evidence', in S.
Stenlund (ed.), Logical Theory and Semantic Analysis (1974) p. 113 at p.
121; see also M. Ockelton, 'The use of Mathematical Probabilities in
Assessing Corroborative or Convergent Testimonies' (1982) 24 Ratio p.61
at pp. 62-7; see A. Stening, Bevisvarde, (Weight of Evidence), (1975)
and, 'Evidence and Statistics (unpublished 1983); see also Per Olof
Bolding, Bevisbordan Och Den Juridiska Tekniken (Burden of Proof and
Legel Technique), (1951).

4. M. Ockelton, op.cit. pp 67-8.

5. See above ch.6   p 140 and below ch. 10   pp. 250 et seq

6. Ekelof, op.cit. p.60.

suggested two methods for the performance of this task. The

first method involves an intuitive survey of the whole complex

of evidentiary facts in the light of general experience which

apply to them. The problem with the intuitive survey, according

to Ekelof is that it does not enable the judge to describe exactly

how he reached his judgment.[7] For this reason he seems to prefer

another method of evaluation which combines both the intuitive

and discursive analysis of evidence:

> On the other hand, intuition is influenced by our
> earlier experience, although our attention is not
> focused upon it at the moment of the intuitive
> judgment. Therefore, there are good reasons for
> assuming that the result will be more reliable if
> the judge has previously undertaken a careful
> discursive analysis of the material available as
> evidence. In the present writer's view such an
> analysis can only be performed in the manner discussed
> above. First, it is necessary to try to arrive at
> an evaluation of the convincing force of each
> particular evidentiary fact against the background
> of the general experience and of available auxiliary
> facts. In this process, the different links in
> the chains of evidence must be examined separately.
> Thereafter one proceeds to assess the combined
> convincing force of those facts which support the
> allegation that a certain ultimate fact exists.
> From the sum thus obtained, finally one must
> subtract the combined force of such counter
> evidence as supports the existence of facts
> incompatible with the allegation.[8]

Eklof seems to be caught in a dilemma arising from his awareness

that experience contains no generalizations to match and deal

with a complex of evidentiary facts: the interaction between

experience and the evidence in the case should strike a balance

between the necessity of relying on explicit generalizations which

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7. Ibid pp. 60-1.

8. Ibid p. 61.

result in discursive analysis that undermines, in the light

of Eklof's awareness of the limited role of experience, the role

of the evidence as a whole; or reliance on an intuitive composite

hunch about the force of the whole evidence which experience

cannot afford.   The last course would in addition confront the

fact finder with the situation in which he could not explain or

justify his decision.   For this reason Eklof is indifferent as

to which method the trier of fact starts with provided that 'the

final result, however, should always be based, in the present

writer's view, upon an intuitive evaluation of the whole evidence.'.[9]

As we shall shortly see the views expressed by Ekelof are

remarkably similar to the recent views expressed by Peter Tillers.

B.   Coherence and Consistency

Another unexpressed dissatisfaction with the atomistic

analysis can also be detected in the resort by some evidence

scholars to such notions as 'consistency', 'themes and theories

of a case', 'stories'.[10]   A reference to such notions is, in my

view, an unconscious rejection of explicit analysis based on

encapsulated, propositionalized and compartmentalized experience.

It is this rejection of explicitly generalized experience which

gives these notions their holistic tinge.   Resort to such notions

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9.   <u>Ibid</u>. pp. 61-2.

10.   See L. Bennett and S. Féldman, <u>Reconstructing Reality in the
Courtroom</u>, (1981);   D. Binder and P. Bergman, <u>Fact Investigation</u>,
(1984);   W. Twining and T. Anderson, <u>Analysis of Evidence</u>, (forth-
coming);   W. Twining 'Anatomy of a Cause Celebre: The Evidence in
Bywaters and Thompson', (Earl Grey Memorial Lecture, Newcastle, 1982);
Neil MacCormick, 'The Coherence of a Case and the Reasonableness of
Doubt' (1980) 2 Liverpool Law Review, p. 45 and, 'Coherence in
legal Justification' (1984);   Theorie der Normen Festgabe Fur Ota
Weinbergen zum 65 Geburtstag   p 37.

can also be seen as an indication in the direction of an
alternative unformulated or fluid conception of experience,
which aids the fact finder in the selection from the total body
of received evidence those facts which are acceptable to him.
Such a conception of experience, if sufficiently articulated and
related to the task for the fact finder with respect to the
structures of the evidence; its various divisions and the
relations of those divisions to the ultimate facts; and the
relation of those ultimate facts to the applicable legal rule or
rules, provides a distinctive and rational method for the
performance of that task.[11] It is regrettable, however, that
very little serious effort in that direction has been exerted
by evidence scholars. Professor Neil MacCormick who has made
various references to the test of consistency expressed the need
for more serious research in that direction when he wrote,

> For quite arbitary reasons of space and time I have
> chosen to exclude from this book any extended
> consideration of the process of proof, the processes
> of reasoning from evidence, of justifying conclusions
> inferred from evidence, and of justifying the rules
> which determine what constitutes evidence and what is
> excluded as inadmissible. That is worthy of a book
> in itself, a book which would both draw on and
> contribute to the philosophy of science and the
> philosophy of history.[12]

The notions of coherence and consistency form a central
theme in a recent analysis in which Bennett and Feldman offer
the story model as an analytical tool for the analysis of judicial

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11. See below ch. 10, Sections A and C.

12. See Legal Reasoning and Legal Theory, (1978), p. 88, see also
p. 100.

evidence.[13]   The book contains plausible arguments whose potential

was not fully explored or developed.   One of the main reasons for

this seems to be the unfamiliarity of the authors with an intricate

and multi-disciplinary subject.[14]   This unfamiliarity is, in its turn,

the cause of their basic misconception of the role of the rules of

evidence (or what they refer to as courtroom procedures, or formal

procedures of a justice process).[15]   They believe quite wrongly

that lawyers regard these rules as responsible for the production

of justice.[16]   They thus waste much time attacking this false

target.   Consequently they devote a lot of space to the justifi-

cation of the role of common sense generalizations, or implicit

understanding as they referred to it.[17]   They concluded that:

'O nce it is clear that implicit judgement practices (and not

the formal procedures of a justice process) are responsible for

the production of justice, it is possible to explore the meaning

of justice in society.'[18]   Another misconception which probably

diverted the attention of the authors from exploring the potential

of their analysis is about the objectivity of fact finding.   The

authors assumed quite incorrectly that the 'justice procedures'

are believed by lawyers to perform the objective and mechanical

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13.   Reconstructing Reality in the Courtroom, (1981).

14.   For the limited information and data on which the authors reached
their conclusions see ibid. pp 11 et seq; see also ibid. ch. 4 for
the experiments conducted by the authors.

15.   See Reconstructing Reality, ch. 1 pp 3 et seq.

16.   Ibid. p 4.

17.   Ibid. p 26.

18.   Ibid. p 32.

function of rediscovering facts.[19]   In fact they conducted a

number of experiments to demonstrate the mistake of such belief.[20]

On these assumptions and from the authors observation of a limited

number of criminal trials they conclude that the criminal trial

process is a simple story telling process.[21]   They see this as

an important discovery: ' o ur search for the underlying basis

of justice and judgment in American criminal trials has produced

an interesting conclusion: the criminal trial is organized around

storytelling.'[22]   Important functions and roles are assigned by

the authors to the 'story'. It helps the fact-finder to organize,

store, check, revise, structure and interpret a vast body of

information. It provides an analytical device for legal judgment

and, in addition to that, it provides a coherent theoretical

framework for legal trials.[23]   However, the main importance of

the story for the construction of legal judgments was claimed to

be the fact that they organize information in ways that help the

listener to perform three interpretive operations. First, the

interpreter must be able to locate the central action in a story.

This is the key behaviour around which the point of the story is drawn.

Second, the interpreter must construct inferences about the

relationships among the surrounding elements in the story that

impinge on the central action.   The connections among this cast

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19.   Ibid. ch. 2-3.

20.   Ibid. pp 66-90.

21.   As to the information on which they relied see ibid. pp 11-18.

22.   Ibid. p 3.

23.   Ibid. p 4-5.

of supportive symbols create the interpretive context for the action
or behaviour at the centre of the story. Finally, the network of
symbolic connections drawn around the central action in a story
must be tested for internal consistency and descriptive adequacy
or completeness. This simply means that the interpreter must
determine that the various inferences that make up a general
interpretation for a story are both mutually compatible (in light
of what is known about similar episodes in the real world) and
sufficiently specified to yield an unequivocable interpretation.[24]
The attribution of these mysterious and metaphysical powers to the
story is rather strange. The absence of any adequate explanation
as to why or how stories can perform these functions makes things
even worse. However, it seems that they assume that reference
to the 'story' itself signifies without further explanation the
existence of a complex of 'implicit social understandings' which
the listener not only knows, but has both the ability and the
skill to apply for the determination of these various tasks.[25]
The analytical model which the story provides as a basis for legal
judgment presupposes, according to this interpretation, the
existence of such a complex of knowledge, together with the ability
and skill of the fact finder to manipulate it and apply it in
structuring and integrating stories.[26] This assumption may
explain why important issues such as the reliability of evidence,

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24. Ibid. p 41.

25. Ibid. pp 61-2.

26. Ibid. ch. 4 and pp 44-5, 47 and 61-2.

its probative value, the distinction between evidentiary facts and ultimate facts, and the relation of the last two to the possible legal conclusion are not considered by the authors. It is also important to know that the authors express no doubt about the role of experience to justify individual inference. However the authors' adoption of social frames as general cognitive models of social action is not, as we shall see, without its use for the holistic analysis.

C.   Tillers' Attempt.

A conscious effort to interpret and criticize the conventional approaches to fact finding problems can be seen in the recent account by Professor Peter Tillers in his Modern Theories of Relevancy.[27] Despite Tillers' use of terms such as 'atomicity' and 'holism' which are important new conceptual tools, his account consists merely of a critique of the atomicity of atomism.[28] His reference to the evidence as a whole or even holism, as we shall see, occurs in contexts in which these terms are simply used to provide a contrast with atomicity.[29] For this and other reasons, to be explained shortly, I shall argue that Tillers' version of holism is as limited as the versions of other emerging holists. Before embarking on that criticism, I shall attempt a brief summary of those aspects of Tillers' account which are relevant for our purposes.

The analysis is basically a critique of what Tillers termed

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27. Reprinted from section 37 of Wigmore on Evidence, vol. 1A, Tillers (Rev.) (1983).

28. See Tillers, op.cit. pp 1059, 1067, 1079, 1081, and 1083. 1086

29. Ibid. s. 37.7 (n.10).

the modern theories of relevancy.[30]   He included under that label

theories of logical relevancy, Cohen's account of inductive

probability, as well as mathematical approaches to relevance and

evidence.[31]   The central critical theme against all these theories

is that they insist on a very restrictive and narrow standard of

rationality:

> Our central criticism is not, as it might be supposed,
> that Michael and Adler had an insufficient understanding
> of the possible implications of the 'calculus of chances' –
> which they did – but that their conception of reason was
> too narrow insofar as it asserted that rational processes
> are those which conform to the model of logic as a
> formal system with carefully defined constituents and
> which employ exhaustively defined operational rules to
> transform statements of one form in   statements of
> another form.[32]

The same accusation is levelled against Professor James, the

mathematicists, and Jonathan Cohen,[33]   Tillers views the

insistence of the theories of logical relevancy and inductive

probability on explicit structures of inferential mechanism,

in the form of common sense generalizations, as a product of that

unduly constricted image of rationality.[34]   However, the author

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30. Ibid. ss. 37.4, 37.6 and 37.7.

31. Id.; the main sources considered by Tillers are: J. Michael
and M. Adler, 'The Trial of an Issue of Fact' (1-11) 34, Colum.
L.Rev. 1224, 1462; Professor James 'Relevancy Probability and the
Law' (1941) 29 Calif. L.Rev. 689; Trautman 'Logical or Legal
Relevancy – A conflict in Theory', (1952) 5 Vand. L. Rev. 385; V. Ball,
'The Moment of Truth: Probability Theory and   Standards of Proof',
(1961) 14 Vand. L. Rev. 807 and, 'The Myth of Conditional Relevancy',
(1980), 14 Ga.L.Rev. 435; Weinstein, 'Some difficulties in Devising
Rules for Determining Truth in Judicial Trials' (1966) Colum. L. Rev.
223.

32. Tillers, op.cit. 1030.

33. Ibid. ss. 37.4 and 37.7.

34. Ibid. pp. 1039-40, 1071.

does not doubt, or question, the inferential nature of judicial

processes in which 'experience' provides the nomo logical founda-

tions of inference.   But he considers reference by the theory of

logical relevancy to generalizations as an over-simplification of

the nature of conceptual interpretive mechanisms.[35]   He sees in

the works of Jonathan Cohen a significant contribution which reveals

the complex and elusive nature of generalizations.   But it does

not go far enough:

> However, in our view, Cohen does not take us far enough,
> either qualitatively or quantitatively.   Qualitatively,
> he does not take us far enough because, all provisos
> considered, he still takes the view that the interpretive
> conceptual principle that speaks to the probative force
> of a piece of evidence in essence still amounts to a
> statement that describes (within its appropriate domain)
> certain events that occur with a certain frequency
> relative to other events.   However, there are conceptual
> interpretive structures that, though speaking to the
> probative force of a piece of evidence, take a quite
> different form.   The term "generalization" implies
> that the beliefs and theories and concepts of the
> observer always amount to a generalized description of
> the course of nature that constitutes an extrapolation
> from regularities noted by the observer in a limited
> number of instances.   However, "experience" can work
> in quite different ways and may lead to the formation
> of conceptual and interpretive systems that cannot
> easily be described as statements that describe the
> relative frequency of various types of events under
> various conditions.[36]

Tillers notes a principle defect in Bayesian analysis of the nature

of inference.   It is 'its failure to adequately account for the

fashion in which a fact-finder in fact uses a complex of assumptions,

beliefs, theories, and received or self-developed perspectives in

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35.   Ibid. pp 1073, 1079.

36.   Ibid. p 1079;   see also ibid. p 1077.

his evaluation of the degree to which an item of evidence adds

force to the probability of some fact in issue.'   He again explains

this on the narrow conception of rationality to which Bayesians

subscribe.   They, according to his view; 'treat the nomological

foundations of inference as irreducible and unanalysable ("subjective")

primitive assessments in all instances...."[37]   The author noted

further the atomicity of the analysis by all conventional theories

and criticised it:

> The legal habit of taking evidence piecemeal and supposing
> that each separate piece of evidence thus admitted may be
> considered separately for its evidentiary significance
> seems to reflect a Bayesian cast of thought.   But there
> is no intrinsic reason for supposing that all evidence
> will or must present itself in this dissected form;   we
> may encounter some masses of evidence that we do not
> know how to dissect in a meaningful fashion without
> destroying the significance and value we see in the
> evidence as a whole.   We may discover, contrary to
> received legal wisdon, that some evidence does seem to
> be intrinsically or inherently related to other evidence
> and that the assumption of the atomicity of separate pieces
> of evidence does not hold.   Indeed, we may discover or
> believe that some masses of evidence must be treated as
> a whole and connot be meaningfully dissected into pieces
> at all.   In this case, Bayesian analysis is of no use
> whatever, for there are then no primitive hunches to be
> integrated into composite hunches.   There is, as it were,
> only one hunch with regard to the evidence as a whole.[38]

The two terms 'evidence as a whole' and 'holism' are not explained

or analysed.[39]   Their main function in the analysis seems to provide

a contrast with atomicity.   It provides also the opportunity to

introduce an alternative or modified standard of rationality:

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37.   Ibid. p 1073.

38.   Ibid. pp 1067-8.

39.   See above, n 28.

> We believe that rational evaluation can remain rational
> even though the process employs presuppositions and
> processes that remain implicit, and there is no need
> to force a choice between explicit and implicit
> inferential processes since it is quite sensible to
> think that rational evaluations may involve both implicit
> and explicit processes.   To demand that everything be
> made explicit is to foreordain the failure of reason
> since the demands we make on reason are too great and
> hence are impossible to satisfy.[40]

This unstructured, fluid and elusive conception of experience

as the foundation of inferential processes is a matter for the

fact-finder to apprehend and apply in partitioning the evidence

as well as assessing its probative force:

> If it may be assumed, as we do, that fact-finding can be
> "rational" even though no transcendental basis exists
> that determines the appropriate classification,
> characterization, or dissection of evidence, it seems
> probable that rational inquiry into the nature and
> implications of evidence and facts is advanced when the
> trier persists, insofar as possible, in the effort to
> determine whether the characterization, interpretation,
> dissection, and so on, of the evidence that he has
> adopted is in fact a truly meaningful dissection and
> characterisation (from his point of view) in the light
> of the assumptions and beliefs he entertains (both of a
> general character as well as of the general constitution
> of the whole of the evidence before him).   It is
> tempting to think that what happens (and should happen)
> is that a trier of fact - any trier of fact - engages in a
> sequential process in which there is a repeated reciprocal
> interaction between a general vision of the evidence as a
> whole and a general vision of its parts, a process in
> which each vision is progressively revised and checked
> by the other but in which neither can ever be supposed,
> in principle, to be entirely independent of the other.[41]

It is hoped that this summary, though brief and general, contains a

fair and accurate description of Tillers' views.   In what follows

I shall express a few remarks, by way of criticism, by which I shall

either elaborate some general points I alluded to in the course of

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40.   Tillers, op.cit. p 1040.

41.   Ibid. pp 1083-4.

the exposition, or point out and discuss new points

As has already been noted Tillers' account consists in the main of an attack on atomicity which is just one of the other various features of atomism.[42] However a proper understanding of atomism, which is a prerequisite of a comprehensive holistic thinking demands a search into the complex factors which make up atomism.   Such a search should include a careful and deep look into the underlying philosophical framework of the conventional evidence tradition, its approach to analysis, what it regards as a proper candidate for such analysis, its understanding or lack of understanding of the problems of evidence and the corresponding task they pose for the fact finder in different types of cases in legal trials.   The search should also include the meaning such a tradition assigns to experience, and the role it assigns in judicial inquiries and problem solving in general.   Most important of all, such a search must question the appropriateness of the cognitivist attitude of that tradition toward thinking, inquiry, and problem solving in judicial fact finding inquiries.   The answers to these and various other questions related to them, as we have shown in this thesis, should provide the basic features of atomism which constitute the proper target for holistic attacks.[43]   In this light it can be seen that Tillers' understanding of what is wrong with the conventional theories of relevancy is not broad or deep enough to outline and comprehend the various parameters and features which constitute its atomism.   We have already noted some context

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42.   See above, nn. 28 and 38.

43.   See below ch. 10, pp

in which this lack of full and comprehensive coverage of atomism
allowed some mathematicists and other atomists to question atomicity
without realising at the same time the effect of such questioning on
the validity of the methods they adopt and defend.[44]   The reason
why these mathematicists and others fail to detect any inconsistency
in attacking atomicity and retaining atomism is explicable on the
ground that holism contrasts with atomism not atomicity.

Another limitation in Tillers' account is his contrasting
holism with atomicity without feeling any need to explain or define
what he meant by holism apart from his reference to its negative
standard of rationality.   His suggested standard is a mere contrast
to the standard of rationality of conventional systems.   It does
not conform to logical forms of reasoning or resort to explicit
inferential structures.   If this is, as I understand it to be, a
concession on the part of Tillers that any alternative standard of
rationality should abandon any claim to logicality, that concedes a
great deal to atomism.   It is, in effect, an acceptance of the
rationalist thesis that analysis is only possible within logical
domains.   According to this view the domain of logical analysis
does not include either the process of thought of the investigator
or the structures of the material on which he works.   The reason
which is generally given is that any thought process prior to the
expression of its final result is hidden from any observer.   It
is not possible for anyone, and probably the investigator himself,
to tell exactly how he thinks and why he thinks the way he does,
what forms and aids his thought processes and his conception of
relevancy and rationality.[45]   However, this view accepts the

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44.   See above, ch. 8, p.174.

45.   See below ch. 10, Section B; P. Medawar, _Induction and Intuiion in
Scientific Thought_ (1969) p.8.

position that the investigator is probably the best judge of his

thought processes.   This cognitivist and subjectivist view seems

to appeal to Tillers since he accepted the fact-finder as the best

judge of the partitioning of evidence as well as the evaluation of

its probative force.   Of course this may be true in situations

where the observer knows nothing, or very little, about the data

on which the investigator works and the nature of the task he is

called upon to perform in relation to that data, and how that

type of task in relation to that data is normally performed in

similar contexts.   However, when, as in legal trials, the observer,

like the fact-finder, can have the same knowledge about the data

and the nature of the task and what is normally required for its

performance, our concern ought not to be directed to what actually

passes inside the mind of the fact-finder during a trial process,

but what should and ought to be his responses in relation to a

definite body of evidence with respect to a definite task.   In

this sense the nature of the evidence and that of the task and our

knowledge of what the performance of that task in relation to that

evidence demands on the part of a fact-finder, supply the logical

and heuristic frames for the manner of performing that task.   As

I shall argue later on in this thesis, my analysis provides a

strong argument for a logic of judicial discovery distinct from

that of scientific discovery and a better explanation for the basic

concepts of evidence and the trial processes.[46]

Tillers' account can also be criticised for accepting or

at least condoning atomistic assumptions such as the inferential

nature of the trial process, the role of experience in providing

the inferential foundations for such processes, the emphasis on

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46.   See below ch. 10, pp 259 et seq.

the interpretive structures of the evidentiary facts rather than those facts themselves, and possibly the transitivity of evidentiary reports to the legal conclusion and the assignment of prior probability to that conclusion.[47]

Tillers' discussion of relevancy and weight is the most problematic and least satisfying aspect of his account. His general assumption, or at least what his title suggests and his treatment confirms, is to treat the entire problems of proof as problems of relevance is an obvious indication of his failure to distinguish between relevancy and weight.[48] Tillers' views in this respect are expressed mainly as part of his criticism of the theories of logical relevancy. The gist of his criticisms seems to be this: the claim of these theories to deal with relevancy rather than weight is incorrect. It is incorrect, according to Tillers, because the determination of relevancy for the purposes of admissibility often confronts the fact-finder with the problem of weighing the evidence to determine its probative force. The activity of weighing for this purpose involves the selection by the judge of a general proposition which is accepted as providing a covering law for the evidential proposition in question. The conjunction of these two propositions yields a conclusion or an inference which equals the probative force of the evidential fact. The same process and activity of weighing is encountered by the fact finder in assessing the probative force of the admitted evidence.[49] Having construed logical relevancy in that way, Tillers saw its major sin

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47.   Tillers, op.cit. pp 1031, 1059 and 1073

48.   See above ch. 3, n. 69,   and below ch. 9 n. 54.

49.   Tillers, op.cit. pp 1022, 1024-5, 1089-90, and 1086 (n. 10)

in its reliance on explicit and articulated inferential mechanisms (generalizations).[50]

An inquiry into whether Tillers' construction of these theories of logical relevancy is correct or not, and whether the criticism he based on that construction is valid, is not necessary or even important for our present purposes. This is so because my own conception of logical relevancy is not affected either by his construction or criticism. Apart from this point, his criticism seems to be based on a confusion of two possible contexts of weighing covering two distinct activities of weighing employing different structures and mechanisms of judgment.[51] One possible context, which is not necessary for the determination of relevancy, involves a timeless weighing. The weighing of the probative force of the admitted evidence, on the other hand, is circumscribed in various specifiable ways. For this and other purposes it is important to state what I mean and understand by logical relevancy.

The account which follows is a simple description of my conception of logical relevancy. Logical relevancy presupposes the existence of observable regularity in nature which can be, and is in fact, used to support the making of law-like statements about the course of nature. How these statements are thought out and investigated, confirmed, qualified, accepted and their degrees of reliability determined is not essential for the theory of logical relevancy. They, together with the initial conditions necessary for their application, are assumed to exist as part of objective human knowledge. Each of these laws stands

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50. *Ibid.* pp 1039, 1071-3

51. For example see, *ibid* pp 1022, 1024-5, 1089-90, 1086 (n.10).

in one relation or another to other singular propositions which tend
either to validate or invalidate it.   Logic neither creates nor
identifies the existence of this connection.   When the law and its
initial conditions are expressed logic can work out the formal
connection between the two.   To identify the law and its initial
conditions provides a function for logic, but the identification
itself is not a logical function.   It follows that logic cannot
assist in the determination of the acceptability of a general
proposition, the determination of the conditions under which it
is acceptable or applicable, or the strength of the inference it affords
under those conditions.   So the role of logical relevancy is
limited to stating the relationship between two propositions: a
general proposition performing the function of a law of experience
which applies under certain specified conditions, and a particular
proposition which performs the function of an initial condition
or one of the initial conditions for the application of that
general proposition.   It is this abstract connection between the
law of experience and its initial condition, or conditions, which
constitutes logical relevancy.   In this sense, logical relevancy
can be interchanged with potential relevancy when 'actual relevancy'
is used as a synonym of 'proof'.   However useful that distinction
may be in other contexts, in a legal context the concept of relevancy
should have a distinctive function identifiable independently of
the mental processes of the fact-finder or investigator.   For this
reason I shall contrast the relevancy of evidence with its weight
or probative force.

In a legal context relevancy simply means an abstract
relationship which can be expressed as follows: with regard to
the requirements of a particular legal rule which specifies the

establishment of certain conditions for its application (ultimate facts), and when all or any of these conditions must be established in any inquiry regarding the application of that rule, then, any proposition (about an evidentiary fact) which tends to stand, either by itself or in connection with other propositions, in the relationship of initial conditions or one of the initial conditions for the application or otherwise, of one or more of the initial conditions of the legal rule, is relevant. To the question why a particular proposition is relevant to another general proposition the answer is simple: the former stands to the latter in the relationship of initial condition. Accordingly the degree of the acceptability of the general proposition, the truth or probability of the particular proposition, the probative force of the particular proposition and the degree of that probative force and its sufficiency either by itself or in connection with other propositions to establish the issue to which it relates, are matters which have no bearing whatsoever on the determination of relevancy. Some of these matters (i.e. the truth or probability of the evidentiary proposition, its probative force in the trial context, and the sufficiency of that probative force cannot be determined in advance of the actual trial process which, in any particular trial context, is a stage subsequent to that of the determination of relevancy and admissibility. The importance of the distinction between relevancy and weight and its validity, does not stem from the fact that these determinations occur at two different stages in the trial process, or that each task is (in cases tried by jury) performed by a different body. It is important from a holistic point of view because relevancy performs, in a trial context, a distinctive function different from that of weight or probative force. It is also important

since holism assigns to articulated experience (commonsense generalisations) an important role in determining what is relevant in the sense already explained.   Holism does not regard the judging process in a trial context as an inferential process in which either explicit or implicit presuppositions, or both, provide the inferential base for that judgment.   In a judicial context a judgment is always comparable to a new invention in natural sciences.

In the light of the preceeding discussion we can now turn to   Tillers' views about relevancy, weight, and probative force.   As has already been indicated Tillers' construction of logical relevancy is different from the present author's conception of it.   He considers the weighing of evidence to determine its probative force to be essential for the determination of relevancy.[52] What he seems to have in mind is a timeless weighing in which the acceptability and the inferential soundness or probativity of a general proposition is assessed by the judge in order to assess the force of the conclusion to be drawn from it in conjunction with the evidentiary proposition to which it relates.   This conception of weighing is no doubt possible where a legal rule demands it as a requirement of admissibility.   In such a case the legal rule would stipulate a certain standard of general probative force as a condition of admissibility.[53]   This would mean that the general proposition under which the particular evidentiary proposition can be subsumed should attain a certain standard of inferential soundness or probative force which would secure the required standard of probative force for the conclusion to be drawn from the conjunction of the two propositions.   Tillers seems to doubt the role of logical relevancy

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52,   Ibid. pp 1019-26.

53.   For an elaborate discussion of this point see M. Y. Abu-Hareira The Protection of the Accused Against Prejudice, 1970 (unpublished) ch. 3.

to provide an adequate standard of admissibility. His view is
that 'many and perhaps most admissibility decisions properly and
necessarily require that the trial judge assesses the weight of
the proffered evidence.'.[54] This view of Tillers is based on the
commonly repeated claim that 'every proposition of fact is relevant
to every other proposition of fact'.[55] To say, by way of justifi-
cation of such claim, that logic cannot perform the role of
excluding the possibility of a relationship between any two facts
which can be cast in a logical form is to misconceive the role and
function of logic. This point has already been explained.[56]
Tillers attributes to logic a role which it does not claim, and it
cannot perform.

> How does a court logically assert that one fact may be
> inferred from another fact, and because of logic alone?
> It does so by asserting a logical connexion between two
> propositions of fact, an assertion that takes the form,
> if X, then Y. This connexion between X and Y is purely
> a logical connexion logic, however, cannot establish
> the degree to which this proposition should be regarded
> as probable. But how does logic determine whether one
> proposition of fact is relevant to another proposition
> of fact? Simply by saying so, as it were; for logic
> alone cannot rule out, in any case, a connexion between
> two propositions of fact that take the form, if X, then
> Y. Accordingly, in a strict sense, every proposition
> of fact is relevant to every other proposition of fact.
> This is shown simply because every two propositions of
> fact can be logically related by casting them into the
> form of the logical proposition, if X, then Y.[57]

It is true that any proposition of fact can be cast in a logical
form making it formally relevant to any other proposition of fact
as in; if X, then Y. Tillers' criticism of logical relevancy
would have been valid had that test been advanced by the theory
of logical relevancy. Logical relevancy as I understand it does

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54.   Tillers, op.cit. p 1025.

55.   Ibid. p 1027.

56.   See above pp. 201 et seq.

57.   Tillers, op.cit. p 1027.

not accept this purely formal connection as the test of relevancy. What makes a proposition relevant to another is not its logical form or its occurrence in one of the argument places in a logical functor in which the other proposition occupies the other argument place. It is the existence of a relationship between two types of events which we know from our previous experience that justified the casting of propositions about these events in a logical form. Logical relevancy should therefore be confined to this type of casting which excludes any arbitrary formal casting as the test of relevancy. When logical relevancy is understood in this way the claim that it renders every fact relevant to every other fact becomes groundless. A proposition of fact is relevant if there is a general proposition which tends when conjoined with the proposition of fact to yield a conclusion supporting the existence or non-existence of the matter of fact in question. The supposed knowledge by the judge of the common sense generalisations and their relationship to other propositions which perform the function of the initial conditions for their application, rendered the identification of this connection for logical casting a simple task. However, the determination of relevancy involves no process of inference or weight. This is so because relevancy in judicial inquiries performs a function different from the function of weight. Relevancy admits in most cases all possible proofs including contradictory evidence. Accordingly any attempt to weigh relevant evidence in order to determine its reliability, its probative force and its sufficiency to establish any fact to which it is relevant is incompatible with the principal role of relevancy as a test for admissibility of conflicting and contradictory evidence. The only possible weighing in this context is a timeless one of each

evidentiary proposition in isolation from any other proposition to determine its <u>general</u> probative force.

Tillers associates weight with this timeless weighing and thereby conflates the two conceptions of weighing to which we have already referred.[58]   He does not see a valid distinction between weighing by the judge (for determining relevancy) and weighing by the fact-finder.   This position of his can only be maintained on the assumption that weighing is always a timeless one simply because weighing by the judge cannot be anything but timeless.   This view also finds support in his rejection of generalisations and explicit inferential mechanisms because of their inadequacy to supply the inferential structure of weighing.   He probably saw for the same reason the inadequacy of explicit presuppositions for the determination of relevancy.   This may explain why his account is silent on this point.

Tillers refers to some situations in which the judge is confronted with the problem of weighing the evidence before determining its admissibility.   This takes place where the evidence is both relevant and prejudicial to an accused person.[59]   It is true that in such cases the test of relevancy by itself is not sufficient.   The admissibility of the evidence must be based on its probative force.   However this probative force is not the <u>general</u> probative force which results from conjoining the covering generalisation with the evidentiary proposition.   It is a particular probative force of that item of evidence as a member of a consistent

58.   See above p. 200.

59.   See Tilelrs, <u>op.cit</u> p 1022.

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body of evidence.[60]   This type of probative force is different

from the general probative force of an item of evidence because

it is not inferred from the general proposition.   This weighing

is not timeless. . .

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60.   See below ch. 10, Sections A and C.

CHAPTER 9

An Early Holistic Conception of
Judicial Fact Finding

A. Introductory Note

The current probability debtates in this country and the

United States can be seen as significant attempts to raise some of

the problems relating to judicial fact finding either at the level

of the individual element or/and that of the total mass of judicial

proof.   However these attempts have not proved successful because

their approach is basically atomistic.[1]

A similar intellectual concern took place in the Scotland

of the late eighteenth and early nineteenth centuries.   The

discussions at that time, of philosophical speculations and their

adaptation to the solution of the epistemological and methodological

problems of moral inquiries and evidence connect directly with the

current Anglo-American concerns in the same field.[2]   In particular,

James Glassford's book entitled An Essay on the principles of Evidence

and Their Application to subjects of Judicial Enquiry, is a skilful

adaptation of the "Common Sense" philosophy to problems of judicial

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1.   The main contributions to the debates have already been given
in ch. 6 above.

2.   Thomas Reid's Works which were edited by Sir William Hamilton
in 1803   include: An Inquiry into the Human Mind (1704), Intellectual
Powers of Man (1785), and Essays on the Active Powers of Man (1788).
These works shall be referred to as 'Reid's Works', the reference is
to Hamilton's Seventh edition (1846).   The works of Dugald Stewart
which are of interest to us are, Account of the Life and Writings of
Thomas Reid (1803), published in Reid's Works; Elements of the
Philosophy of the Human Mind; 2 Vols. (Vol. 1, 1792-1812, and Vol. 11,
1813-1821, hereafter referred to as "Elements" followed by volume number,
'The dissertation on the progress of sciences,'see below n. 9;
of G. Beattie's writing, our interest is in his Essay on Truth (1820).

fact-finding.[3]

B.   Glassford and his Essay

Very little information is available on either Glassford or his books and other writings.[4]   Apart from what may be gathered from his own writings, there is hardly any useful information in print about him or his Essay.   The only available source which purports to account for his life and publications is an entry in The Dictionary of National Biography.   That entry, however, does not contain Glassford's date of birth and incorrectly gives the date of the publication of the Essay as 1812 instead of 1820.[5]

According to the above mentioned source, Glassford was the son of John Glassford of Dougalston.   He was admitted to the faculty of advocates in 1793.   He became Sherriff-Depute of Dumbartonshire and succeeded to Dougalston in 1819.   He died in Edinburgh in July 1845.

Although Glassford's interests were vast and varied,[6] his interests in the legal field were primarily in evidence and

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3.   Hereafter referred to as "Essay".

4.   I have spent a considerable time looking into Scottish magazines, Reviews and journals of the first half of the 19th century in the hope of finding useful information on either Glassford or his books. Very little came out of this effort.   I also consulted other probable sources, but again the result was fruitless.

5.   See an entry in DNB under "James Glassford"; see also an entry on John Glassford.

6.   As to his other interests see id.; see also some of his contributions to the Supplement of the Encyclopaedia Britannica (1824) which included one article on C. B. Beccaria, and another on John Bacon (a sculptor).   Glassford's contributions were signed "EE".

and procedure. His first book, <u>Scottish Courts of Law</u>, was published in 1812. The <u>Essay</u> was not intended originally to be published as a book. As Glassford himself told us in the advertisment to the <u>Essay</u>, it was intended as a contribution to the <u>Supplement</u> of the Encyclopaedia Britannica.[7] It was probably one of the four discourses on the progress of science proposed in a letter by D. Stewart to A. Constable in 1812.[8] The other three Dissertations, which were actually published in the <u>Supplement</u>, were by D. Stewart, John Playfair, and W. Thomas Brande.[9]

The fact that the essay was not meant originally to be published in book form may explain its heavy emphasis on the theoretical aspects of evidence. This circumstance may be one of the reasons for the deplorable disregard of the <u>Essay</u> by the legal profession. An early reference to Glassford's <u>Essay</u> lends support to this conclusion. It is by George Tait:

> The author had this work nearly ready for the press, and had written this preface, when Mr. Glassfurd's (sic) work on evidence was published. But, although that work contains enlarged and interesting views on the general sources and principles of evidence, it did not appear to him to supersede the occasion for a work of more detail and reference to authorities for practical use.[10]

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7. See <u>Essay</u>, advertisment page..

8. See <u>Encyclopaedia Brittanica vol</u>. 9 p 379 (History of the Enclyclopaedia.)

9. See D, Stewart "The progress of Metaphysical, Ethical and Political Philosophy since the Revival of Letters in Europe", Supplement of the Encyclopaedia Britannica (1824) vols. 1 and 5, pp 1-166, 1-252 (hereafter referred to as "Supplement"); J. Playfair, "The progress of Mathematical and Physical Science, since the Revival of Letters in Europe", <u>Supplement</u> '1824) vols. 2 and 4, pp. 1-127 and 1-90; W. Thomas Brande, "The Progress of Chemical Philosophy, from the Early Ages to the end of the 18th Century", <u>ibid</u>. vol 3 pp. 1-79.

10. See, <u>A Treatise on the Law of Evidence in Scotland</u>, (1824) preface p. xii; see also Glassford, <u>Essay</u>, advertisment page

The disregard and neglect of Glassford may also be explainable as part of the general neglect and disregard of the philosophical tradition which constituted his intellectual sources, i.e. common sense philosophy.[11] It is rather ironical that Glassford's book was abridged and translated into Spanish as early as 1842.[12]

C. Glassford's Intellectual Sources

Whether or not Glassford is a philosopher in his own right, is a matter which can not be adequately investigated in the present thesis.[13] However, the first part of his book contains many indications of his original and independent thought.[14] It contains a critical assessment of the major philosophies in the Western Tradition from the early Greeks to his own contempories.[15] Leaving the issue of his originality apart, Glassford was either a follower of the Scottish School of common sense or one of its important

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11. N. MacCormick Legal Right and Social Democracy (1982) p. 103: The following interesting reference to Glassford occurred in J. Cohen's The Probable and the Provable p. 281 (n.4)," f or implicit anticipations of the view that judicial probabilities are inductive it is interesting to look at the account of "degrees of legal evidence", and their balancing, in J. Glassford, An Essay on the principles of Evidence and their Application to Subjects of Judicial Enquiry (1820), pp 638-80.... The most interesting parts of the Essay, i.e. those rejecting the employment of mathematical analysis and doubting the usefulness of the Baconian methods in the field of judicial proof were not referred to by J. Cohen.

12. Los Principios de la prueba, y su aplicacion a las Pesquisas Juridicas, por Santiago Glassford, Jose Maria T. Y. Herrera, (Trans.), 1842.

13. For the same reasons similar issues relating to Bentham were not dealt with in chapter 2 above.

14. See Essay, pp 1-230.

15. It is a matter of interest that both Glassford and Bentham managed to avoid reference to one another. This may be explicable by the fact that Bentham wrote in 1802-13, but published after Glassford.

members.[16]   Though he made occasional references to George Beattie[17]

(the references are to Beattie's Essay on Truth) he shared most of

the views of Thomas Reid and Dugald Stewart.[18]   Since the philosophical

tradition to which Glassford belonged, namely the common sense

philosophy of Reid and Stewart, contrasts significantly with the

philosophical sources of the atomistic rationalist tradition, it

is important to consider the main assumptions and doctrines of

that philosophy.[19]   However, before attempting that task it is necessary

to make it clear that our main concern with the Scottish philosophy of

common sense is limited to an attempt at ascertaining its contribution

to the thought of James Glassford as expressed in his Essay.   For

this reason the controversies surrounding the sources of Thomas Reid;

his interpretation and understanding of the 'ideal theory';   who count

as members of the Scottish common sense school are not of much concern

for our present purposes.[20]   In what follows I will consider some of

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16.   The School was founded by Reid.   Those who are considered
to be its members include in addition to Beattie and Stewart, J.
Oswald and probably Sir William Hamilton, see generally S. A. Grave,
The Scottish philosophy of Common Sense (1961), p. 5.

17.   First ed. 1770 (Edinburgh).

18.   See above n. 2.

19.   For further references on Reid and Stewart see generally, A.
Seth, Scottish Philosophy (1885) Lectures 111 and 1V;   L. Schneider
(ed.), The Scottish Moralist, (1967);   S. A. Grave, op.cit. J. D.
Newell, Philosophy and Common Sense (1980) p. 43 et.seq.

20.   See generally D. Stewart, Account of the Life and Writings
of Thomas Reid, op.cit., and Elements II, pp 85-92.

the basic relevant features of their philosoohy and its doctrines.

(1)   Main Objectives of Common Sense Philosophy

The main objectives of the Scottish Common Sense philosophers

in general and Reid and Stewart in particular can, for present

purposes, be stated as follows: (i) To refute what they termed

'the ideal system' or 'ideal theory';   (ii) To offer, explicate

and vindicate a common sense approach to the philosophy of mind

and knowledge; and (iii) to advocate the application of Baconian

methods of investigation for the acquisition of general knowledge

in both natural and moral inquiries.

(a)   The Ideal System

For Reid and other members of his school the 'ideal system'

included Descartes, Malebranche, Locke, Berekeley and Hume.[21]   The

ideal system, according to Reid, derived both its spirit and

fundamental principles from Descartes.[22]   It originated in

Descartes' universal doubt which prevented him from admitting anything 'but

what was absolutely certain and evident'.[23]   Descartes, doubt was

based on the supposition that his senses, memory, reason and every

other faculty might be fallacious. For this reason he resolved to

disbelieve everything, until he was compelled by irresistible

evidence to yield assent.   Descartes noticed, however, that the

mind is conscious of its own operations of thinking and doubting.

He concluded from that assertion that the only reliable faculty of

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21. See Reid's Works, passim and esp. pp 99-104, 201-9, 298-306;
Stewart, Elements I chs. 1, 2 and 4.

22. Reid, Works p 204.

23. Ibid. p 205.

of the mind is that of consciousness. According to Reid the 'ideal system' was grounded on that principle which attempted to establish the existence of the material world and truth through consciousness.

> Des Cartes no sooner began to dig in this mine, than scepticism was ready to break in upon him. He did what he could to shut it out. Malebranche and Locke, who dug deeper, found the difficulty of keeping out this enemy still to increase; but they laboured honestly in the design. Then Berkeley who carried on the work, despairing of securing all, bethought himself of an expedient:- By giving up the material world, which he thought might be spared without loss, and even with advantage, he hoped, by an impregnable partition, to secure the world of spirits. But, alas! the "Treatise of Human Nature" wantonly sapped the foundation of this partition, and drowned all in one universal deluge.[24]

According to Reid the 'ideal theory' admitted one first principle, namely, the faculty of consciousness.[25] As a consequence the ideal theorists were led to 'give attention only to operation, of which the mind is conscious without borrowing 'his' notion of them from external things'[26]. Existence, according to Reid's interpretation of the ideal theory, is 'what by just reasoning can be deduced from our sensations.'[27]

The major defects of the ideal theory or system as seen by the Scottish Common Sense philosophers can be roughly stated as follows

(i)   Simple ideas or notions: The Scottish Common Sense philosophers rejected the notion of the ideal theory which represented the faculty of consciousness as merely furnishing the mind with simple

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24.   Ibid. p 103; for a charge that Reid and his followers misinterpret the ideal theory see, for example, S. A. Grave op.cit. ch. 3 esp. p 86 et.seq.

25.   Works p 206.

26.   Ibid. p 205.

27.   Id.

apprehensions or 'notions' which the mind has of things without

forming any judgment or belief regarding them before it further

compares them to determine their agreement or disagreement.[28]

This distinction was not acceptable to the Common Sense philosophers

since it disregarded the fact that every operation of sense involves

both a simple apprehension of the object of sense and a judgment or

belief about it.[29]   Reid viewed the matter in a completely

different light;

> [T]hese first notions are neither simple, nor are they
> accurate and distinct: they are gross and indistinct,
> and, like the chaos, a rudis indigestaque moles.
> Before we can have any distinct notion of this mass,
> it must be analysed; the heterogeneous parts must
> be separated in our conception, and the simple elements,
> which before lay hid in the common mass, must first
> be distinguished, and then put together into one
> whole.[30]

(ii)   Distinction between knowledge and judgment

It was argued further that the distinction made by the

ideal theory between 'knowledge' and 'judgment' is not acceptable.[31]

This is so because the distinction between self-evident or intuitive

conclusions and those which result from reasoning is groundless.[32]

According to Reid and Glassford the knowledge we get from either

sense or reflection (consciousness), with the exception of the

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28. Ibid. p 208, Glassford's Essay, p 170.

29. Ibid. p 209; J. Glassford, Essay, pp 2, 3, 15, 62-3.   G. Beattie's Essay on Truth, pp55, 360.

30. Works, p 418, see also ibid. pp 419 and 421; see also Glassford's Essay, pp 63-4.

31. Reid, Works, p 415,426; Glassford, Essay, pp 64-6, 68, 69. Reid and Glassford rejected the treatment of judgment and knowledge as faculties of the mind, see Reid Works p. 415   ; see Glassford Essay, pp 62-3.

32. Reid, Works, pp 308, 420 ; Glassford, Essay, p 66, when he stated that 'the real difference, in like manner, between self-evident or intuitive conclusions, and those which are the result of reasoning, lies, not so much in the nature of the intellectual faculty which is exercised, as in the repetition of its acts, and the duration of the process', see also ibid. pp 64-5.

conception of simple apprehensions, involves judgment and reasoning.[33]

Consciousness has no great advantage over external senses.

> Mr Locke very properly calls consciousness an internal
> sense. It gives the like immediate knowledge of things
> in the mind - that is, of our own thoughts and feelings -
> as the senses give us of things external. There is this
> differance, however, that an external object may be at
> rest, and the sense may be employed about it for some
> time. But the objects of consciousness are never at
> rest: the stream of thought flows like a river, without
> stopping a moment; the whole train of thought passes
> in succession under the eye of consciousness, which is
> always employed about the present. But is it
> consciousness that analyses complex operations,
> distinguishes their different ingredients, and combines
> them in distinct parcels under general names? This
> surely is not the work of consciousness, nor can it be
> performed without reflection, recollecting and judging
> of what we were conscious of, and distinctly remember.[34]

(iii)   Appeal to Reasoning

The major defect of the 'ideal theory' according to the

Scottish Common Sense School is its appeal to reasoning to establish

facts and truths which can not be established by reasoning. These

facts are matters of belief which cannot be regulated by reasoning.[35]

The philosophy of the 'ideal theory' attempted to establish by

reasoning what ordinary people of common sense accept without proof:

> Poor   untaught mortals believe undoubtedly that there
> is a sun, moon, and stars; an earth, which we inhabit;
> country, friends, and relations, which we enjoy; land,
> houses, and movables, which we possess. But philosophers,
> pitying the credulity of the vulgar, resolve to have no
> faith but what is founded upon reason.[36]

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33. See Reid, Works pp 360 et.seq and pp 418 et.seq; see Glassford, Essay, p 62.

34. Reid, Works, pp 419-20.

35. Reid, Works, p 100; Glassford, Essay, p 14.

36. Reid, Works, p 100; see also ibid. p 482.

Common sense philosophy offered 'First Principles' or
'Fundamental Laws of Human Belief' to counter and refute the
scepticism of the ideal theory. To this we shall now turn.

(b)   What is Common Sense?

The primary sense in which Reid used the term Common
Sense was to denote the source of what he called the original and
natural judgments about existence and faith.   According to Reid
these judgments

> [A]re the inspiration of The Almighty, no less than our
> notions or simple apprehensions.   They serve to
> direct us in the common affairs of life, where our
> reasoning faculty would leave us in the dark.   They
> are part of our constitution; and all the discoveries
> of our reason are grounded upon them.   They make up
> what is called the common sense of mankind; and,
> what is manifestly contrary to any of those first
> principles, is what we call absurd.   The strength
> of them is good sense, which is often found in those
> who are not acute in reasoning.[37]

Reid also used the term common sense to describe an ability shared by
common people to discern evident truths.[38]   He also used it to mean
the common judgment of mankind as a measure of truth.[39]   Both
Reid and Beattie were criticized for the imprecise use of the term
already noted.[40]

The account of common sense given by Glassford, who also

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37. Ibid. p 209; see Beattie's Essay on Truth, pp 55, 360 (where he
opposed common sense with reasoning).

38. See Reid, Works pp 422 et.seq, this is probably the same as the
'Universal Cognitive Competence' recently revived by Jonathan Cohen,
see below n 85, and the accompanying text,

39. Reid, Works p 423.

40. See D. Stewart, Elements II, pp. 85-93.   Stewart attempted to defend
Reid (ibid. pp 91-3) by throwing the blame on Beattie who believed common
sense as 'a power of the mind which perceives truth, or commands belief,
not by progressive argumentation, but by an instantaneous, instinctive and
irresistable impulse', Beattie, op.cit. p 40.

criticized both Beattie and Reid is very clear.[41]   For Glassford

common sense denotes 'that belief which is entertained by men in

general, of the information given by their various faculties:'[42]

He did not seem to accept its other meaning as 'that ordinary

measure of knowledge and information which these faculties afford;

and, in this last acceptation, resolves into a common or general

consent of mankind'[43]   In its second possible meaning as a

measure of truth in general, common sense, according to Glassford,

is too vague a doctrine to be admitted without many limitations.[44]

In this regard Glassford is in agreement with Stewart who consciously

avoided the employment of the terms 'first principles'.   What Reid

termed 'first principles' or Common Sense, Stewart called 'Fundamental

Laws of belief'.   Stewart summarized these laws and explained their

nature, and criticized Reid's terminology in the following passage:

> From such propositions as these – I exist; I am the
> same person to-day that I was yesterday; the material
> world has an existence independent of my mind; the
> general laws of nature will continue, in future, to
> operate uniformly as in time past – no inference can
> be deduced, any more than from the intuitive truths
> prefixed to the Elements of Euclid.   Abstracted from
> other data, they are perfectly barren in themselves;
> nor can any possible combination of them help the
> mind forward one single step in its progress.   It is
> for this reason, that, instead of calling them, with
> some other writers, first principles, I have distinguished
> them by the title of fundamental laws of belief; the
> former word seeming to me to denote,according to Common
> usage, some fact, or some supposition, from which a
> series of consequences may be deduced.[45]

Accordingly, the doctrines of Common Sense are axiomatic.

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41. Glassford, Essay, 160-6.

42. Ibid. pp 163, see also pp 164-5.

43. Id. see also ibid. pp 119-20.

44. Ibid. p 164.

45. Elements, II, pp 59-60, see also pp 52 et.seq.

Their truth is 'metaphysical or transcendental.[46]   In this respect

they have nothing in common with Common Sense Generalizations.   The

essential role of Common Sense doctrines is to refute the sceptical

doctrine of the 'ideal theory'.   According to both Reid and Stewart

the acquisition of general knowledge in both moral and natural fields

of inquiry is regulated by the Baconian methods of investigation.

This we will consider in the next section.

(2)   Scientific Methods of analysis and investigation.

(a)   Mathematical analysis:

Reid, Stewart, and Glassford opposed the application of

mathematical analysis to moral inquiries.[47]   Their opposition was

based on the incompatibility of that type of analysis to moral

inquiries.   I shall deal with this point in a subsequent section

in this chapter.[48]

(b)   The Baconian Methods of investigation.

Both Reid and Stewart were great admirers of Francis Bacon

and his methods of investigation.[49]   The method itself was included

in one of the first principles of Common Sense by Reid.[50]   According

to Stewart:

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46. Ibid. p 57, but see Glassford, Essay, p 18-9 (where he used the
terms 'first principles'.

47. Reid, Works, Vol. 11, ch. 1V. , also Works, Vol.1., ch. 1;
Stewart, Elements, II ch. 2; Glassford, Essay, pp 77, 79, 90, 190-9.
The analysis they opposed was the type of analysis suggested by both
La Place and David Hartley, see below pp. 240 et seq.

48. See below, p 236.

49. Reid, Works passim, see esp. pp 436, 484-5; Stewart, Reid
Works, p 8; and, Elements, I pp 48-56, and Elements II chs. 4 and 5.

50. Works, p 436.

>The idea of prosecuting the study of the human mind, on a plan analogous to that which had been so successfully adopted in physics by the followers of Lord Bacon, if not first conceived by Dr Reid, was, at least, first carried successfully into execution in his writings.[51]

Though Glassford seems to have been interested in the writings of Francis Bacon,[52] he had no great faith in the application of the Baconian method to moral inquiries.[53] This stance marks him off from that enclave of the Scottish school consisting of Reid and Stewart, so he is not a 'Baconian'; neither is he an idealist, nor a sceptic nor a Pascalian. If he is not any of these, what makes him different? In what follows I shall argue that Glassford is a holist. I shall explain his approach and contrast it with the atomistic approach in relation to relevance, common-sense generalisations and probabilities in judicial fact finding processes.

D. Glassford's Approach to the analysis of Evidence

(1) Relevance and Weight:

The relation between the relevance and the weight of an evidentiary item and the lack of a proper distinction between the two concepts is a source of great difficulty and confusion in writings on evidence and proof.[54] To understand the relation, and

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51. Ibid. p 8.

52. Glassford translated Bacon's 'Exemplum Tractatus de Fontibus Juris' in 1823.

53. See Essay, pp 188-9, 195-9; see also below n 96, and the accompanying text.

54. See for example Phipson on Evidence (11th ed. 1970) p 64; see also Wigmore on Evidence (1940) Vol.1 pp 289-411. The distinction which Wigmore made between weight and relevance (inference) is of an entirely different kind from the one I have in mind. It is one between the impact of the probative force of a single item of evidence and that of a total mass. It's significance is to show that a single item of evidence has no demonstrative or conclusive proof, see ibid. p 296. What I have in mind is that certain relevant items may have no probative value in the particular circumstances of a case.

grasp the main source of the confusion, it is desirable to observe that there was a time in the history of the law of evidence and its discourse when both concepts were unknown. The concept of evidence itself covered both. That was so when evidence consisted of Testimony and documents which were believed to be credible according to an a priori scale (rules of competence). When the rules of admissibility were satisfied the observation of a competent witness was regarded as equivalent to observation by the Tribunal itself - evidence was proof.

The subject of evidence was the 'fact in issue' in its totality, so the issue of 'inference' did not arise. In this sense its sufficiency could not raise any issue. A concept of evidence so narrow and limited entails an equally limited mental operation on the part of the fact-finder. Proof was seen as very similar to perception.

Clearly, any change in this concept of evidence and its object is bound to involve new mental operations on the part of the fact-finder. This change can be said to be brought about by the acceptance of circumstances as evidence.[55] Obviously circumstantial evidence posed new problems for discourse about evidence. The first problem, which was not posed by testimony or documentary evidence, was what made a circumstance 'evidence'? The second problem was that, unlike testimony and documentary evidence, a circumstance may be admitted without rendering 'proof'; that is, a single circumstance is never sufficient to prove a probandum, indeed. The first problem poses the issue of relevance, the second poses that of weight. It is interesting to note that Bentham's and Glassford's examples of

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55. Compare, for example, I. Hacking, The Emergence of Probability (1975) pp 31-48.

relevance came mainly from circumstantial evidence, and the same thing can be said about weight.[56]   A test of what renders a circumstance relevant was needed.   When that test was provided circumstantial evidence was still found to be different from 'evidence' of testimony in another important respect , it involved a complex mental process on the part of the fact-finder to determine its persuasive force. The last issue is distinct from that of whether or not the sources relating the individual circumstances are credible or not.   This is still an aspect of testimonial evidence in so far as circumstances are generally proved by evidence of testimony.   It can be seen that the credibility or reliability of the source of evidence is distinct from the impact of the evidence on the mind of the fact-finder.   The former is credibility, the latter is weight.   The importance of the issue of credibility, for our present purposes, is that it meant that both testimonial and circumstantial proof can be unreliable as asserted. Evidence, therefore, was distinct from credibility and weight.   A failure to make this distinction is often occasioned by thinking about evidence in its narrow and limited sense explained above.   The applications and definitions of relevance in terms of probative force are good examples of this confusion.[57]

By contrast, Glassford made the distinction between relevance and weight central to his conceptual framework and consistently adhered to it throughout his book.   Unlike many scholars, he made no direct connection between relevance and weight and his clear distinction avoided the whole source of the confusion associated with the

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56.   See Bentham, 7 _Works_, ch. 4;   see Glassford _Essay_, pp 569-70.

57.   See above n 54   ;   see also ch. 8 pp 192 _et seq_.

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relation between the two terms. He stated in relation to suspicious

evidence:

> [O]n account of some reasonable suspicion attaching to it,
> [objectional evidence] may be received in the absence of
> other proof... But it is obvious that in such examples,
> where evidence of a suspicious kind is admitted for
> consideration, the credibility of it, or the effect which
> it shall have upon the mind of the judge or jury is a
> separate thing, and must... be weighed by the dictates
> of reason, and the natural principles of belief.[58]

The concept of relevance was not treated in a detailed or systematic

manner by Glassford. His thinking about it has to be constructed

from his views about the consistency of truth, the concurrence of

proofs and the role of commonsense generalizations and probabilities.

However, he referred to relevant facts as

> [F]acts which being proved serve to create a reasonable
> belief, in the absence of testimony or other direct evidence,
> are in general either such as usually attend upon and are
> connected with that other fact, not discovered, which is the
> object of inquiry; or such as in all cases attend and
> are combined with it, such as cannot, according to our
> notions of the consistency of truth be supposed separate
> from it, and without which it appears utterly inexplicable.[59]

These remarks can be criticized as representing proof as one-sided

and overlooking the heterogeneous nature of judicial proof. But

as has already been mentioned, the other concepts used by Glassford

about proof are interrelated. The above remark by Glassford, there-

fore, should be read in conjunction with his views on the consistency

of truth and the role of generalizations which will be explained below.

When this is done, the concept of relevance will be seen to be confined

to facts which point to any of the possible conclusions.[60] It is

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58. See _Essay_, pp 260-1, see also p 571.

59. _Ibid._ pp 569-70, and 258-9, 573.

60. _Ibid._ pp 186-7 and 575.

true that these possible conclusions, when viewed within their sets or types, are capable of being thought of probabilistically. In this relation a fact can be said to be probable , or more probable or less probable than another related fact. The mental process of the fact-finder involves comparative judgments regarding the frequency of occurrence of the set members. In judicial proof we are not concerned, normally, with a set or even comparable sets. But even within a single set, relevance is not concerned with judging frequency. It is concerned with identifying their 'possibility' as members of the set. In so far as each member of a set is known to have existed before, it is relevant, if its existence is connected with the subject of inquiry. To argue that relevance is concerned with probability or probative force is to say that what is comparatively less probable is irrelevant; while, in fact, we admit any relevant evidence of a fact and its contradiction, and one of them must be comparatively improbable. In short, it can be said that when we think of what is relevant we are simply conceiving the possibility of the 'relevant', not perceiving it. We are not believing or judging or even comparing.[61] According to Glassford judging and believing in judicial fact finding processes should not be done, in point of time, and reasoning, in a deductive manner from general experience or what takes place in the majority of cases.

He has a particular concern for the individual case.[62] This is shown by his discussion of presumptions:

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61. See Reid, Works, pp 360-79; for a criticism of Reid's views on conception see Stewart, Elements I, ch. 3 pp 133 et.seq.

62. Glassford, Essay, pp 130-1.

226.

>Presumptions, on the other hand, are conclusions drawn
without regard to the circumstances of an individual case;
and sometimes, though not necessarily, are independent of
any proof respecting even the implied will or motives of
a party. They are conclusions of a general nature; or
such as, being comformable to what most frequently
happens under the circumstances where we have evidence
of the fact, are applied to cases where the same situation
occurs, but in which we have no evidence, either direct or
indirect of the particular fact. They are inferences
drawn from that which takes place in the great majority of
instances.[63]

This particular regard for the individual case should emerge clearly

when we discuss his views and the holistic approach to judicial

proof in relation to weight.

(2)   Weight:

The discussion of a single item of evidence or a total mass

usually employs terms like: weight, inference, credibility,

assessment, etc.   The concept of weight is generally used to include

all of these.[64]   It is sometimes used to signify the actual impact

of the 'evidence' on the mind of the fact-finder.   This ought to be

possible only when we take into account the internal point of view of

the fact-finder regarding the operations of his mental powers.[65]

It can also be used to describe the function which is usually performed,

in evidence discourse, when discussing what fact-finders usually do

when they are weighing.   In this last respect it is usually done

without taking into account the internal point of view of the fact-

finder.   We are here concerned with 'weight' and its cognates in

relation to four contexts.

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63. Ibid. pp 582-3.

64. However see above n. 54.

65. See Glassford, Essay, p 182.

The first deals with the credibility of a source of evidence. The second with the assessment of the impact of a single item on the mind of the fact-finder. The third deals with the indiscriminate impact of a mass of evidence on the mind of the fact-finder. The last context is what is consciously known to the fact-finder to have impact on his mind, i.e. to produce assent. These distinctions and their implications are not generally attended to in discussions of evidence and proof. The operations involving these concepts and the contexts giving rise to them in judicial fact finding and writings about evidence have not, to my knowledge, been questioned. In fact the atomistic approach to judicial proof assumes their existence, and bases its treatment on that assumption.[66] The holistic approach rejects most of these assumptions, as we shall see.

To illustrate what I mean by the assumptions of the atomistic approach we may consider some of Wigmore's views and see what objections can be made against them. For Wigmore, the trial process consists of at least two stages. This can be seen in his 'four steps' of apprehending and evaluating evidence and its source.[67] The first stage consists of successive stages in which each source of evidence is apprehended. At this stage specific single inferences are drawn - the source is believed or disbelieved.[68] When this process is at an end and all the probable inferences are drawn, the second stage starts. This 'consists in the analysis of the effect of a mass of evidential facts. This is something larger than the analysis at each separate fact, though it involves no new canons of reasoning.'[69]

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66. See for an example of this assumption, Wigmore's Science of Judicial Proof (1937) pp 34-6.

67. Id. see also above n. 54.

68. The Science of Judicial Proof, pp 2, 8, 25, 21-2,310, 859.

69. Ibid. p 37 and chs. 30-31.

The importance accorded to generalized knowledge and the role assigned to it in making inferences and asserting propositions are at the heart of the atomistic approach. That position is shared by both the Pascalians and the Baconians. In this respect their analysis is employed on validated inferences.[70] One of the main assumptions of the atomistic approach (Pascalian and Baconian) is that the weighing of evidence, that is to say the crediting of the sources of propositions and the assertion of single propositions as true or probable, starts at the beginning of the trial process. This is basic for the Pascalians (especially the Bayesians) who can not apply their method without a prior assumption. The Baconians' assumption is that the general proposition, under which the elementary proposition is subsumed, is valid and true. The elimination procedures are intended to affirm or exclude the qualifications of that general rule.[71] As we shall see the process of elimination does not function effectively in judicial inquiries; and it is further submitted that the assumption that weighing starts at the beginning of the trial is not sound.

Three basic objections can be made to the atomistic approach: Firstly that the evidence in any contested case normally consists of the elements of at least two contradictory stories. One must be true, the other false. The elements of both stories are inter-mixed. It is, therefore, illogical to assign a truth value or probability indiscriminately to the mixed elements. The elements of the true story can only be known, or believed to exist, when a final decision is made. Prior to that moment no judgment or belief

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70. See above ch. 7.

71. See J. Cohen, The Probable and the Provable, (1977), chs. 13-16, 18.

regarding any single item of evidence ought to take place.[72]

The second objection is that in so far as the elements of proof of an occurrence are connected together and produce proof as a connected whole, no single element of that whole should be treated in isolation from the other elements.

Finally, the atomistic approach is objectionable on the ground that it undermines the factual nature of judicial proof. It converts facts into propositions inferred from general experience with little regard to the circumstances of the particular case.

Support for the first objection can be found in Glassford's notion of the consistency of truth. This notion has narrowed his concept of relevance (as we have seen above) and that of weight as well. According to Glassford weight is the actual effect of evidence on the mind of the particular fact-finder. It is not, even, the effect of the indiscriminate mass of all the evidence in the case. It is the effect of some of the relevant evidence which is found by the fact-finder to constitute a consistent story.[73] As to the second objection, Glassford's view is that the ultimate assent or

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72. See Reid, Works, p 434 where he stated that it is 'not in our power to judge as we will. The judgment is carried along necessarily by the evidence, real or seeming, which appears to us at the time. But, in propositions that are submitted to our judgment, there is this great difference - some are of such a nature that a man of ripe understanding may apprehend them distinctly, and perfectly understand their meaning, without finding himself under any necessity of believing them to be true or false, probable or improbable. The judgment remains in suspense, until it is inclined to one side or another by reasons or arguments.'.

73. Glassford, Essay, pp 569-70.

conclusion is not reached by any consideration of single items of
evidence, separately considered, or in succession. Reasoning can
only obtain ultimate assent on the whole evidence in the case,
and only when proofs concur according to our notion of the
consistency of truth.   On this he said:

> The concurrence of different evidences is a circumstance
> of great importance in the investigation of truth; and
> forms a powerful motive to assent.   From the united
> testimony of many witnesses to the same matter, and,
> generally, from the combination and union of various
> proofs, whatever their kind may be, an additional
> probability arises, and a conviction is produced, which
> may often be much greater in degree than any which would
> be afforded by each particular evidence, separately or
> successively considered.[74]

The above requirement is made particularly clear in relation to
circumstantial evidence.   He thinks that: 'it is the effect of
all the circumstances, combined and united together, which forms
the evidence; and no part of the facts proved, however remarkable
in themselves, shall be considered separately from the rest.'.[75]
As to the third objection we have already seen that he is sceptical
of generalizations used in judicial proof.   For him;

> [T]here is no positive line and boundary, according to which
> the truth or falsehood of the fact testified can be
> assigned, without a consideration of the particular
> evidence so adduced.   It cannot be resolved, a priori,
> that any contingent truth, by whatsoever number of witnesses,
> and in whatsoever circumstances attested, is absolutely
> incredible.   It is a question of more or less.   The
> individual,instances must always be examined, without
> resting in the supposed general rule; and the judgment

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74. Ibid. p 216, 'Consistency of Truth' is an important principle of
Common Sense philosophy.   It means that 'of their contradictory
propositions, if we can prove one to be necessarily true, we thereby
prove the other to be necessarily false.   Contingent truths admit of
being proved in the same manner, not demonstratively indeed, but probably.
In many subjects of probable reasoning, if we prove either of two
contradictory propositions to be probably true, we no less prove thereby
that the other is probably false, whether the medium of proof be the
same in both, or different methods be applied...' Reid, Works, p 73-4;
see also Glassford, Essay, p 34.

75. Essay, p 573.

can only be formed after such an examination of particulars.[76]

If the above analysis is correct then it follows that with regard to each independent issue, there is one moment in the trial process where the evidence ought to be weighed. That moment is at the very end of the trial when all possible evidence on that issue has been heard. One possible objection is that as a matter of practice, relevant evidence is adduced in stages and each single item at each stage must have an impact on the mind of the fact-finder, and as such, have some weight. Glassford would probably have a number of answers to this objection. The first of these probable answers is that judicial proof, invariably, involves complex issues and various mental processes, but it is ultimately resolvable by the faculty of reasoning. According to Glassford:

> In every conclusion of reasoning, not only are we conscious of exercising the faculty of reasoning, but we have also a belief of some existence or relation, concerning which our judgment is formed, or on which it is employed. The latter kind of assent does not, indeed, in every exercise of the reasoning faculty, necessarily follow our conception of the terms, or the definition of them, nor attend each part of the process; for the assent accompanies the conclusion, and the process of judging is not complete till the mind has formed its inference. But whenever the last step is made, and the ultimate conclusion reached, then follows in all cases that act of assent or belief, which has now been noticed as the peculiar result of evidence.[77]

The second possible answer may be that, it is true that the evidence may have an impact on the mind of the fact-finder but that impact need not be a belief. It involves a conception of the facts, and, of course, perception of the fact that they have been asserted by

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76. Ibid. pp 215-6

77. Ibid. p 2; see also above n. 72.

witnesses, if that is the case, but there need be no inference about the existence or non-existence of the fact testified to. It is quite familiar in any day-to-day affair in life that we suspend belief in the existence of a fact or matter in the knowledge that more information is on its way to us.[78]

A clear and distinct contrast between James Glassford's views and the holistic approach, on the one hand, and the atomistic approach, on the other, can be seen in the attitude of the former to the use of common-sense generalizations (or generalized experience) in the process of weighing evidence. In the next section we shall consider in this light various attitudes to common-sense generalizations.

(3)   Common-sense Generalizations.

The commonly accepted view in writings on judicial proof is that an inference from each individual fact, adduced in evidence, can only be believed or disbelieved by being conjoined to a general proposition whose truth is generally accepted. The qualifying term 'generally' in the preceding sentence is meant to indicate that the inference or conclusion from such generalizations is not a necessary one. This is so because;

> [M]uch of our every day vocabulary has been developed to
> describe the complexly diverse surface features of our
> everyday experience, and the terms of this vocabulary
> do not readily line up one-to-one with one another in the
> construction of well-supported first-order generalizations.
> Human conduct, plant and animal life, the weather   all
> these are fields for which we have a rich descriptive
> vocabulary. But we can rarely construct well-supported
> generalizations about these fields in terms of our every-
> day vocabulary without introducing several qualifications
> into the antecedents of the generalizations.[79]

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78.   See above n. 61; see also Reid, Works, pp 222-4.

79.   J. Cohen, The Probable and the Provable, pp 201-2.

233.

The incomplete nature of these proof-rules (i.e. the relevant
generalizations) prompted Wigmore's analysis contained in his
'four steps' and his chart-method.[80] Mr. Jonathan Cohen endeavoured
to apply Baconian methods of investigation together with those
of Mill to ensure the inferential soundness of these proof-rules.
His basic assumption is that the eliminative procedures of these
methods are effective at the levels of inductive support and
inductive probability.[81] If this basic assumption is wrong, then,
the same question, namely how are these eliminations made and
what aids the fact-finder to make them, poses itself anew and
demands an answer which Jonathan Cohen does not provide. Let us
for the purpose of testing the assumption take one of Jonathan
Cohen's examples. I shall limit my criticism to this case only.
For this reason the example to be chosen is a very simple one in
which the choice of the initial hypothesis, the evidence indicating
it, the fact that it is well-supported and the proper choice of the
relevant variables should be assumed. The example is:

> Perhaps a policeman swears, and defending cousel
> accepts that the accused was found at 3 a.m. in the
> garden of a house which had just been burgled, and also that
> the stolen jewels were then in his pocket. The
> conclusion proposed (italics added) by the prosecu-
> tion is that the accused was the burglar. The rough
> generalization tacitly invoked as a licence for this
> inference might be that normally, if an object has been
> moved from its usual place and a man is found nearby immed-
> iately afterwards in possession of the object, then he
> deliberately removed it himself. So the defence has
> to try to prove, in effect, that this generalization is
> inapplicable to the situation in question. Perhaps,
> for example, the defence can produce testimony alleging
> that some other stranger also was in the garden imme-

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80. Wigmore, Science of Judicial Proof, pp 34 et.seq.

81. The Probable and the Provable, p 175.

> diately after the burglary and that the defendant merely
> picked up, with the intention of returning, what the
> other man had dropped.   Clearly the presence of one or
> more other people is one relevant variable for such
> generalizations as that tacitly invoked by the prosecution...
> So the prosecution, in order to remove any element of
> reasonable doubt, would need to destroy the force of the
> defence's testimony in some way...[82]

This example assumes much of what the method of relevant variables,

and its eliminative procedures, is intended to achieve.   One of the

relevant variables, however, is the alleged presence of other people

at the scene.   How is this proposition to be resolved?   It may

be true or false.   What about the allegation that the accused was

seen running away?   Both these involve issues of crdibility and it

is admitted by Cohen that questions of the credibility of testimonial

evidence can raise issues about a number of relevant variables.[83]

But issues like the above are real issues in judicial proof which

should not be assumed.   In physical sciences and inquiries which

admit of controlled experiments the elimination of alternative

explanations is achieved by the observed findings of the experiment

itself.   In judicial proof it is a complex reasoning process.

Glassford anticipated such methods and their limitations when he wrote

that:

> When we endeavour, as above, to apply the scientific
> methods of calculating probabilities, to measure, for
> example, the degrees of probability in the evidence of
> testimony, we are immediately met by this difficulty,
> that the terms are unknown;   an obstacle which, in
> reasoning, not from hypothesis, but fact, renders the
> information so acquired nearly, if not altogether,
> useless.   We neither do, nor can know, the number of
> cases in which men have given evidence in particular
> supposed circumstances; and we neither know, nor can

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82. Ibid. pp 248-9.

83. Ibid. pp 250-1

know, the number of cases in which men so circumstanced
have spoken the truth. There is therefore no real
light gained by the calculus.[84]

It seems that both Wigmore and Cohen regard this as a pure subjective

exercise in which the fact-finder's competence can be assumed. Cohen

mentioned this in the following:

> The inductivist analysis, however, has no difficulty at all
> here. It presupposes only that when a juryman takes up
> his office his mind is already adult and stocked with a
> vast number of commonplace generalizations about human
> acts, attitudes, intentions, etc., about the more familiar
> features of the human environment, and about the inter-
> actions between these two kinds of factor, together with
> an awareness of many of the kinds of circumstances that
> are favourable or unfavourable to the application of each
> such generalization. Without this stock of information
> in everyday life he could understand very little about
> his neighbours, his colleagues, his business competitors,
> or his wife. He would be greatly handicapped in
> explaining their past actions or predicting their future
> ones. But with this information he has the only kind of
> background data he needs in practice for the assessment
> of inductive probabilities in the jury-room.[85]

It may be true that Glassford shares the same conviction as to

'Universal Cognitive Competence', yet he does not accord the same

or a similar role, as the atomists do, to common-sense generalizations.

He expressed this clearly when he said:

> As these calculations are founded upon, and derive their
> authority from, the evidence of experience, so they are
> limited by it; since experience affords the only data
> by which the probability can be estimated. They do not,
> indeed, according to any very accurate notion, furnish
> the evidence of truth or facts, but only serve, by a
> limitation of cases, to determine the reasonableness of
> our expectation in certain given conditions. And, in
> reality, this is the true nature and amount of experience,
> in all instances, so far as it may be said to constitute
> a species of evidence: for the evidence of past and
> present events cannot be said to rest on experience;
> and, with regard to the future, it is a ground of

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84. Essay, pp 197-8.

85. The Probable and the Provable, p 274, see also Wigmore, Science
of Judicial Proof, p 65. Criticized Twining 'Some Scepticism about some
Scepticisms II' (forthcoming).

anticipation only.[86]

(4)   Probability

Glassford referred to two types of probability in his book. One of the probabilities is mathematical, the other is non-mathematical. I chose to refer to the latter as non-mathematical because Glassford's use of it is very general.   In this section I shall deal only with non-mathematical probabilities, reserving the topic of mathematical probability for the next section.

(a)   Non-Mathematical Probability: Though Glassford contrasted what he called moral probability with mathematical probability it is not wholly clear what he meant by moral probability.   He used the word 'probability' in at least four different senses.

Firstly, he used it in contrast with demonstrative and certain knowledge.   In this sense:

> [I]t applies to, and denotes, those truths which, from the
> evidence attending them, we are inclined to believe,
> although that evidence falls short of what we consider
> as certainty... [87]

In this sense it is used at a very high level of abstraction to denote one type of human knowledge as contrasted with another.   This use involves no particular conclusion about a particular knowledge in relation to any circumstance or a mental process of a person.

In a second sense, it is used at an even higher level of abstraction.   In this sense, all human knowledge is probable when contrasted with possible non-human knowledge.   This is the meaning referred to in the following passage:

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86. See Essay, pp 187-8; see also J. Cohen, "Free proof" in William Twining, (ed.), Facts in Law, (1983) p 1.

87. Essay, p 184; see also Reid, Works pp 440, 448, 482 et seq; Stewart Elements, pp 180 et seq.

> Probability and Certainty are relative terms, not only in respect of each other, and as applied to the human mind, but in respect of the knowledge which we may conceive to be possessed by different orders of created intelligence. In the latter sense, it may be true that all human knowledge is comparatively uncertain, as well as comparatively limited.[88]

In the above mentioned two senses probability has no reference to any particular evidence, information, decision or decider. When, however, he refers to a particular decision of a particular person, he does not seem to regard that decision as one of probability. It is a certain decision from the point of view of that decider; he (the decider) accepts the evidence. 'But in the former sense (the case referred to in the passage above quoted in note 88), that is to say, in relation to ourselves and our purposes and duties, much of our knowledge is altogether certain, being attended with such evidence as produces the unqualified assent of our minds.'.[89] This is the third sense in which probability is used. The most interesting aspect of Glassford's treatment of judicial proof is his seeing the effect of evidence from the perspective of the judicial fact-finder. He is not simply reporting 'the decision'.[90] In other words, when the internal point of view of the fact-finder is considered, in the light of the evidence he believes brings about that assurance, his finding is a matter of certainty for him. Finally, he used probability to refer to general conclusions derived from experience. As we shall see, Glassford regards the ultimate judicial decision as a matter of choice for the fact-finder (Judge or Jury) and he does not

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88. Glassford, Essay, p 6.

89. Id.; see also ibid. p 182; see Reid, Works, p 487.

90. See N. M. L. Nathan, Evidence and Assurance, (1980) pp 8-65.

offer a criterion for that decision. In that sense, it is a subjective decision from the external point of view of the observer.

It seems, however, that Glassford would regard all the evidence, before the final decision is reached by the fact-finder as probable evidence in the first sense explained above. This, in my view, explains the following and similar passages written by Glassford: 'the comparison and balance of probable evidence does not admit of being reduced to a system of perfect and absolute rules.'[91] It depends on the extent and nature of the particular proof. Conclusions from experience help the fact-finder to narrow the field of inquiry. He seems to refer to those conclusions when he contrasts mathematical reasoning or probability with what he refers to as moral probability, in the following statement;

> [I]t is unquestionable that principles, similar to those
> on which the ratios of probability may be calculated by
> that science, are admitted into our reasonings on the
> subject of testimony; not, indeed, as limits of this
> reasoning, but as parts and elements of it. Without an
> attention to the qualifications which moral evidence thus
> admits, our knowledge would be altogether vague and full
> of errors.[92]

When referring to the measurability of moral probability his reference to conclusions from experience becomes obvious. This is supported by the following statement. '[t]he only question of importance under this head, is whether, and how far, this probability admits of being measured.' It is difficult to measure for two causes:

> First, from the various extent of the faculties which
> are employed, and the great diversity of measure in
> which they are possessed by different individuals; and,
> Secondly, from the complexity of cases, and the ever-
> varying combination of the premises, on which all our
> conclusions regarding probable or moral evidence depend.[93]

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91. Essay, p 201.

92. Ibid. p 45.

93. Ibid pp 185.

The concept of moral probability is similar to Mr. Jonathan

Cohen's inductive probability.   As we shall shortly see, Glassford

used less rigorous arguments against the applications of mathematical

probability than those used by Cohen. It remains to be said that their basic

points are similar, although the role assigned by Glassford to moral

probability is far less ambitious than that assigned to inductive

probability.   For Glassford's claim is that:

> All that, in many cases, can be attained, is, to
> circumscribe and narrow the range of inquiry, and
> limit, to a certain number, those conclusions which
> are possible, under the actual circumstances; or,
> at most, perhaps, reduce them to an alternative.
> And this, although it is still an imperfect state of
> information, and leaves the truth, even at last,
> involved in some obscurity, is however, in many
> cases, a very important and useful step of knowledge.[94]

So the most that can be achieved by this method is to reduce the

possible conclusions to an alternative, which alternative is just

a possibility.   The only advice that Glassford was ready to give

to the fact-finder is to obtain more facts by enlarging the field

of inquiry and assume one particular explanation or hypothesis and

apply to the known phenomena, and this in succession with any greater

number of conceivable or given hypotheses.[95]

This is comparable to Jonathan Cohen's method of relevant

variables without any claim to an effective objective elimination

procedure.   For Glassford the scientific methods of discovery are

of a limited value and use in moral inquiries.   The eliminations

which are secured in controlled experiments are not possible in

moral inquiries because:

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94. Ibid. p 186.

95. Ibid. pp 223-4.

[M]oral events, or phenomena, distinguished from
physical, do not bear to be experimentally examined
and considered, as those which are strictly of a
physical nature may be; in so far as the individual
cases are less permanent in their duration, and
seldomer repeated under the same circumstances; we
can neither arrest their operation, nor command their
presence, neither combine nor separate the conditions;
neither accelerate the trials, nor renew them.[96]

(b)   Mathematical Probability: It is hoped that reasons have

already emerged from the previous discussion to indicate why

mathematical probability is not acceptable to Glassford as a

criterion of truth in judicial proof.   It seems that he does not

see the possibility of objective criteria in fact finding processes

of mixed nature.[97]   His main arguments were in answer to the method

proposed by La Place for the application of the Calculus of chances

to the combination of testimonies.[98]   He also responded to the

proposed application of the methods of scientific discovery to

judicial fact-finding.   His arguments centre around the measurability

of moral probability to which those methods are recommended;   the fact

that the two probabilities are based on two different premises, that

mathematical probability deals with abstract relations while judicial

proof deals with particular cases.   He argued also that the ratios

in mathematical probability are fixed a priori without a parallel to

be found in matters of moral inquiries on account of their transient

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96. Ibid. p 188.

97. Ibid. pp 201-2, 189, 223-5.

98. P. S. M. La Place, Theorie Analylique des Probablités,(1795);
see also David Hartley, Obervation on Man, (1749) propositions 87-8;
see Glassford, Essay, pp 77, 88, 90, 95, 190-2, 199, 223.

nature, and the fact that they do not admit of being experimentally controlled. Finally, he thinks that judicial methods are by far superior to the suggested mathematical reasoning.[99]

In dealing with the issue of measurability of moral probability Glassford was responding to the proposal of La Place in which he suggested the application of mathematical reasoning to the combination of testimonial estimates. Glassford summarised La Place's view in the following passage:

> Among the ingenious applications which, in late times, have been made of mathematical science to the doctrine of probability, may be here briefly noticed the attempt to calculate the precise diminution of evidence which takes place, or is to be expected, in the transmission of testimony. Let it be supposed, for example, that, in the original report of any fact by an eyewitness, a certain portion only of his report, expressed by the fraction 9/10, may fairly be estimated as true; and that, upon the same principle, a like diminution of the evidence, namely one tenth part, takes place in the report of that first testimony by a second witness; and so on in succession: the probability of an event, it is said, may be thus calculated in an exact ratio, according to the steps through which it is transmitted; and, in proportion to the length of the series, its evidence will be reduced, or altogether destroyed.[100]

For the mathematical calculus to be applicable to the determination of the value of testimony the terms on which the calculation can be made must be the same as those of mathematical probability. They must be measurable in order to receive numerical values. If they are not measurable then the multiplication principle does not apply. Glassford saw one important pre-requisite for measurability in the knowledge of the terms of probability or its premises. He found that impossible in the case of moral probability.[101]

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99. Ibid. pp 43-5.

100. Ibid. p 42-3.

101. Ibid. p 84.

According to this view, probability is a ratio which can be determinate or indeterminate. However, irrespective of the possibility of its determinability, it deals with ratios rather than particular events. For this reason, he does not accept either form of probability as a criterion of proof. As to the determinability of moral probability he has this to say: '[b]ut there are few instances, or classes of events, in which the possible number of cases, or the recurrences to be calculated, can be thus rendered definite, except by hypothesis: and, accordingly, the practical application of such theorem is very limited.'[102]

We have already seen that the mixed nature of subjects of moral inquiry and the extent of the faculties involved in them together with the variety of circumstances render the measurability of the terms of moral probability an impossible task. As we have just seen it is not acceptable to Glassford to determine these terms or render them definite by hypothesis. He concluded that even if the ratios are fixed in whatever manner, it would not be of any help in matters of judicial inquiry because of the lack of replicability of moral acts. 'Neither would it be found, perhaps, if the inquiry could be accomplished, that any number of cases, or even any two cases, ever have been precisely alike in all their circumstances. In these respects, moral probability is altogether different from mathematical, or even metaphysical, proof.'.[103]

It seems that Glassford's objection to the application of mathematical reasoning is a basic one. He regards the supposition of mathematical probability and the possible outcome as pre-determined.

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102. Ibid. p 85.

103. Ibid. p 198.

On top of that it deals with classes and ratios and all this is achieved in a very different way from the determination of judicial proof. He summed up his position in the following words

> But the cases are very different. The results which take place, in consequence of the gravity and figure of a cube, and the resistance of the plane on which it is thrown, admit of calculation, because the possible number of such results are limited, and the principal circumstances attending the experiment, and affecting these results, may be understood with precision; hence, the physical probability, if it may be so called, admits of a determination.[104]

As has already been pointed out this lack of certain and precise determination in matters of moral or judicial inquiry is a sufficient feature to mark off moral probability from mathematical probability and the methods of scientific discovery. In this light the limited value of J.Cohen's eliminative process can be seen.[105] In fact, Glassford anticipated such methods when he wrote;

> It may be remarked, in general, that the same difficulties, which occur in an application of the mathematical calculation of chances to moral truths, will be found to exist in regard to those proposed methods of inquiry which have now been noticed. With respect to all of them, it is observable, in the first place, that they have a reference rather to the arts of discovery or invention, properly so called, than to the rules of evidence; since many things are useful as directions, in the investigation of truth, which cannot be employed, at least in the same degree, for confirming and displaying those truths, of which, after their discovery, the evidence alone is in question.[106]

Glassford did not only regard it impossible to apply mathematical reasoning or probability in order to ascertain the truth of testimony or its probability, but he considered judicial methods to be far superior to those of mathematical probability.[107] It is interesting

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104. _Ibid._ pp 189-90.

105. See above nn. 79, 80.

106. _Essay_, pp 194-5.

107. _Ibid._ pp 43-5.

that he referred to methods, not criteria.   This is quite under-standable in the light of the limited role Glassford assigns to general knowledge in decision making.   However the possibility of such a method shall be investigated in the next chapter.

CHAPTER 10

The Holistic Thesis: and the
Holistic Analysis

A.   The Holistic Thesis

1.   The Fact finding Task.

The concept of holism advanced in this thesis takes

as its starting point Glassford's account of the principles of

evidence as well as the limited expressions of holism in the

classic and contemporary literature on evidence and proof.[1]

It identifies a central theme in that literature which can be

stated as follows: proof is not a function of individual items

of evidence; 'it is a function of the evidence in the case as

a whole.'.   The most significant terms of this proposition

for holistic analysis are 'proof', 'evidence in the case', 'in

the case as a whole'.   However that significance can best be

seen in relation to the developmental complexities of a trial

context.   For this reason I shall refer to the types of case

which categorise, in a general way, the different issues to

which the holistic analysis is related.   There are roughly

four types of case in which the fact finder faces different

tasks.   Let us assume that in each of the following hypothetical

cases we have two parties only: A (prosecutor or plaintiff),

D (defendant in a criminal or civil case).   Let us assume

further that X items of evidence are relevant and admissible.

U is the ultimate factual proposition in issue, and not-U is

its negation

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1.   See chs. 8 and 9 above.

(I)   The first type of case is where A alleges U and D admits the truth of U (D may admit liability in a civil suit and plead guilty in a criminal trial).   In this type of case the task of J is confined to the assessment of punishment or compensation as the case may be.

(II)   A calls evidence tending to prove U, whilst B does not question the truth of the evidence but contests its sufficiency to prove U.   Again J's task does not involve pragmatic or judgemental issues relating to the validation of evidential reports, it is confined to seeing whether or not the relevant standard has been satisfied.

(III) A calls q items of evidence which D does not contest, either arguing (i) that even if U is proved by q U does not satisfy some necessary condition or conditions of a substantive rule of law, e.g. ,the existence of a duty to take care, or the commission of an offence, or (ii) D calls p items of evidence which tend to explain away the effect of q items of evidence. While different standards apply, depending on whether D is a party to a criminal or a civil proceedings, the formal structure of this case is not basically different from the next situation which I will consider at some length.

(IV)   Finally a situation which involves the highest degree of complexity for J is one in which A calls q items of evidence, e.g., q_1, q_2, ..., qn tending to prove U, while D calls p items of evidence in rebuttal.   The whole evidence in the case is $x;(q + p)$.   Let us assume that q consist of q_1 the evidence of an eye witness to the occurrence of U; q_2 the evidence of a witness who testified to seeing D leave the place where U took place; and q_3 which is the evidence of an expert

testifying that fingerprints found at the place where U is
alleged to have taken place are similar to the finger prints
of D.   While these are different ways in which D may challenge
q items of evidence, let us assume that the evidence called
by D consists of one item p, the evidence of a witness testifying
that at the relevant time when U is alleged to have taken place
D was at a different place from which it is impossible for him
to commit U.   This is an extreme example of X consisting of
contradictory parts.   However, many other examples can be
given from situations in which the time element is not so
crucial, as in the previous example.   D may deny an alleged
motive or making a confession for example.   These are just
simple examples to illustrate the type of case where X consists
of contradictory parts.

2.   Distinction between Facts in Issue and Legal
          Conclusions drawn from them

I have so far used the symbols "U" and not "U" to
stand for the ultimate factual proposition to be proved and
its negation respectively.   However, since "the ultimate
proposition to be proved" is sometimes used in two different
senses, it is necessary to explain in which of the two senses
I am using it in this thesis.   In order to do this I will
introduce another symbol 'R' to stand for a substantive legal
rule, and explain the relation of U to R.   Substantive legal
rules, (whether criminal or civil), require certain necessary
conclusions to follow on the satisfaction of certain specified
conditions.   For instance a rule may declare a certain type of
act done with a certain mental state and without justification
a criminal offence or a civil wrong.   Any such legal rule can be
expressed as a conditional of the form 'If a then b': 'a'

stands for the conditions which are sufficient in law for the truth of 'b'. In our simple example 'a' will be instantiated by a conjunction of the three propositions defining the offence, or civil wrong, as the case may be. In any particular case U is alleged to be an instantiation of 'a'; and this is the sense in which I am using 'U' in this thesis. When U (which is usually a compound proposition) is established, it is used as a minor premiss to be conjoined with R as a major premiss, and from the conjunction of the two the consequent of R follows. Sometimes this conclusion is referred to as "the ultimate proposition to be proved". This is the second sense in which 'U' is sometimes used. In this sense 'U' and 'not-U' are used as equivalents of the propositions "D is guilty" and "D is innocent" respectively (hereafter referred to as Q and not-Q). The traditional usage is very misleading and extremely dangerous: misleading because it takes what is generally accepted to be an empirical statement, 'U' as the antecedent of 'if U and R then Q', for a logical proposition viz. (whether if D satisfies the conditions of a legal rule he is guilty); dangerous since it assumes the relevance of the total admitted evidence to that conclusion; it also assumes that the probative force of each item of admitted evidence moves in the direction of that conclusion or its negation. It also assumes that probative force is transitive.

With these distinctions in mind we can now return to our four hypothetical cases. Case (I) illustrates a situation in which D admits the truth of the initial conditions for the application of the consequent of R to his case. It can also be said that D accepts (Q), the conclusion drawn from U and R. Part (i)

of (III) illustrates a situation in which D admits U, but argues

that it is not an instantiation of the antecedent of R, and for

that reason R's consequent does not apply at all; or probably

that there is no rule in the relevant legal system for the

application of which U can be regarded as initial conditions.

(II) illustrates a situation where the truth or probability of

U is the main subject of inquiry for J. The truth of the

evidence reports and hence their correspondence with reality is

not contested. However this is possible only where the evidence

reports indicating U are exclusively circumstantial reports about

U. If on the other hand the evidence in (II) consists of direct

reports about U then it is sufficient evidence. (III) (ii) and

(IV) pose, in addition to the problem posed by (II), two distinct

types of problem. One of these problems relates to the truth or

probability of evidential reports: the other to their probative

force. The solution of these two problems constitutes the basic

and primary task of the fact finder in most types of judicial

inquiries. The first of these problems demands an inquiry into

the correspondence of the evidence reports with the reality which

these reports claim to report truthfully. But since the total

admitted evidence in T consists normally of heterogeneous elements

(in terms of their correspondence, or lack of correspondence with

U), the issue becomes one of enormous complexity. The considera-

tion and inquiry into the second problem should not arise before

the first problem is posed and settled. For this reason the

solution of the first problem requires dividing X into two parts:

the reliable and unreliable reports. Only true reports qualify

for the second stage of the determination of probative force.

I say qualify because a report may be true yet have no probative

force.

An atomistic discursive and sequential analysis of the
whole evidence in the case tends to overlook the heterogeneity
of the evidence and its complexity. It also conflates the two
problems, or disregards one of them, namely the first. To say
that the solution of either problem is the function of the
whole admitted evidence in the case is also inaccurate. As I
shall argue the whole admitted heterogeneous evidence consists
of various parts, and each part provides a self-contained structure
or model against which the reliability of the reports relating
to facts within that part can be investigated - i.e. the prosecu-
tion (or plaintiff aims to tell one coherent story, and the
defence another.[2] According to this view the truth of an
individual report is a function of a consistent whole of which
that report is a member. When this process of investigation
reduces X to its consistent and true parts, another inquiry into
the probative force of these parts to prove U starts. If we
refer to these accepted true parts as Y then we can say X -Y
items have been eliminated in the first stage. Y may also lose
some of its members in the second stage since a report may be
true (motive for example), yet have no probative value in the
instant case. If we use Z to refer to the reports selected by
J from Y as probative of U, then Y minus Z reports are further
eliminated from that portion of the total admitted evidence.
These eliminations which take place at different stages of a
trial constitute a strong argument against any theory which .
considers all members of x to be probative, if only, indirectly,
of an ultimate fact in issue. As a matter of fact there is a

2.   See p 266 below.

clear intransitivity between U and the eliminated parts of X and Y. The much confused use of 'probative force' interchangeably with 'relevance', which abounds in the literature on evidence and proof, is a good example of the failure to see and recognise the practical implications of these eliminations for judicial proof.[3] The most recent illustration of this can be found in David Schum's analysis of different categories of evidence, which is based on the mistaken belief that all relevant evidence is probative.[4] A further illustration is also provided by attempts by Schum and others to organise and evaluate all the admitted evidence in relation to the logical conclusion from the conjunction of U with R (i.e. Q), and the suggestion that the prior probabilities of that conjunction to its negation can provide the basis against which the values of each and every item of evidence can be calculated.[5]

If we take (III) or (IV) as a simple paradigmatic model of a legal trial, and the issues in them as typical issues in most judicial fact finding inquiries, then, in the light of our claims about evidence in those cases at different stages of the trial, the following statements (E) can usually be made about the evidence. The chronological order of the statements is meant to represent in a descending order the reduction of the total admitted evidence by the process of elimination, and in an ascending order the complexity of the task for J (fact finder).

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3. See above ch. 3, n. 69.

4. See above ch. 1, n. 51.

5. See above ch. 6, p 140 and passim.

The model can also serve as a standard against which the competing analytical methods may be evaluated. The statements are that evidence is or includes;

(E)   (1)   All the occurrences or facts reported to J in T (all the admitted evidence in T);

         (2)   All the reports about (1) (evidence reports);

         (3)   Both (1), and (2) above in the light of general experience. (This statement is usually made to emphasize the importance of experience as a method, or a system of propositions, to aid the transition from the acceptance of reports about alleged facts to a belief in their occurrence);

         (4)   The statements selected by J (fact-finder) out of (2) and/or out of (3) to be true, (in the sense of genuine correspondence with reality in a restricted spatio-temporal individual region);

         (5)   Any part of (2) and/or (3) which is rejected by the fact finder, because it lacks correspondence with reality in the sense explained in (4) above;

         (6)   All the statements selected by the fact-finder J out of (4) which he finds to be probative of U or not-U;

         (7)   All the propositions which in addition to satisfying (6) above, are accepted by J to be sufficient proof of U;

         (8)   All propositions which are probative but insufficient to prove U or not-U, as the case may be, to a given

standard.

(9)   The probabities assigned by the fact finder to the
members of (1) and (2) above in the light of (3)
which, probabilities must satisfy the formal
requirements of the calculus of chances, and the
combination of such probabilities, made to assess
the probability of U, by e.g. Bayesian conditional-
isation.

All the propositions in the above model with the exception
of the last one (number 9) are statements descriptive of the
structure of the evidence in a typical trial context in which
the investigation of the evidence of one event or more takes
place.   The matter of fact to be investigated, if it existed
at all, would exist within a limited spatio-temporal region.
The investigation in some trials may involve only one spatio-
temporal region;   however, in most trials more than one such
region is involved.   While the facts which correspond to the
statement(s) about U either existed, or did not exist, in a
given spatio-temporal region(s), the evidence in the typical
context of a legal trial often consists of contradictory reports
about the existence or non-existence of those facts within the
region in question.   For example, if one report asserts the
existence of a fact or occurrence within an individual spatio-
temporal region, while another report asserts the non-existence
of that same fact within that same region, one of the two
reports may or may not be true, but it is logically impossible
for both to be true.[6]

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6.   See ch 9 above n. 74.

The same logical result follows if one report asserts the occurrence of an event within an individual spatio-temporal region, while another report asserts the occurrence of the same event at a different spatio-temporal region. The space - time context of the evidence when the judicial fact finding inquiry extends over more than one such context, provides a self-contained standard for the determination of the truth or falsity of conflicting evidential reports. In such types of case the evidence divides into various distinct structures or parts. The main task of the fact-finder is to work on these parts and resolve any conflict between them. When a number of evidence reports attempts to describe two sets of conflicting realities (spatio-temporally), the fact-finder may declare both sets to be unreliable, or accept one of them to be correct.

Whether the fact-finder is dealing with one self-contained structure or with more than one, he is often called upon to determine three distinct questions about each structure, and the reports which claim to describe it. The first determination refers to whether or not the reports describe a genuine reality (whether they correspond with the spatio-temporally limited event or occurrence). The second determination relates to the probative force of true reports, (true if accepted as genuine description of the reality they report), i.e., whether they establish, or tend to establish, the proposition to which they purport to relate. Since the truth of a report is distinct from its probative force, in relation to a given proposition, the report may well be true yet be without probative force in relation to that proposition. The third question relates to the determination of the sufficiency

of true and probative evidence to establish or tend to establish the proposition to which it relates. Each of the three questions in these inquiries poses a task whose nature is distinct from the nature of each of the other two. However, the determination of the truth or probability of the evidence reports (in the sense explained above) is a necessary condition for entry upon the second inquiry which, in its turn, is also a necessary condition to be satisfied before the third inquiry could be correctly entertained. Apart from the distinction just noted, another important distinction is that each inquiry is determinable on a completely different concept of evidence and proof. The first deals with the empirical basis of the evidence reports, which is a pragmatic task, while the second involves the determination of the logical relationships between accepted statements, and the third deals with the sufficiency of the evidence to establish a proposition, which is also a pragmatic inquiry. For example if we assume that numerical values can be assigned in the determination of each question these values should not be combined for the simple reason that the three problems investigated are incommensurable with one another. It follows that any system which fails to keep the three questions apart, or allows the combination of their values (assuming that is possible) would not only be inadequate for the analysis of judicial fact finding problems, but obviously false. The mathematical analysis, insofar as it overlooks these distinctions and what follows from them, is both inadequate and false as a system. The Baconian analysis, on · the other hand, assumes that it is possible to settle the second problem without determining the first one, and hardly says anything

useful about the third problem. In this respect both systems,
(Pascalians and Baconians), overlook the heterogeneous nature
of the total admitted evidence in a given trial. For this
reason the above statements (4) - (8) inclusive in our model,
which are descriptive statements of the evidence at different
stages in the on-going trial process, have no equivalants in
either the Pascalian or Baconian systems.

The central problems of the atomistic approach to judicial
proof can best be seen in the light of the quest for certainty,
which was believed to be achieveable, through the adoption of
scientific methods of inquiry. The object of this quest was
generally expressed to be the employment of scientific methods
of inquiry in judicial investigations. However, the real
object, as we have already seen in the case of Stephen and that
of Cohen, of such a quest is the identification of general laws
of experience (the common sense generalizations) which are
believed to perform a role in judicial inquiry analogous to
the role of scientific theories or laws.[7] While jurists realize
that scientific methods could not be employed for establishing
these laws they believed that when general laws of experience
are identified, and sufficiently qualified, they perform a
function similar to scientific propositions: an evidence report
provides the minor premiss, and the appropriate generalization
the major premiss from which an inference can be deductively
made. The emphasis is mainly on the theoretical analogue
between scientific theories and judicial inquiries. In the ·
terminology of the methodology of science the emphasis of the

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7.   See above chs. 3 and 6; see also below Section B.

approach is on justification rather than discovery: the
identification of laws rather than the finding of facts and the
selection of genuine reports about reality. The basic problems
of judicial inquiries (the factual problems) are thus bypassed
and overlooked.

Even as a theoretical construct the claim of the atomistic
inductivist approach to provide general inferential laws for
judicial proof is questionable. It does not explain how these
individual inferences can establish complex, independent and,
in most cases, incommensurable issues in a trial. It follows
from this that the current atomistic approaches to the examina-
tion and analysis of evidence undermine the complexity and
uniqueness of judicial fact finding inquiries. The following
remark by Ekelof, when discussing a similar point is in line
with the criticism presently made against the Baconians:

> It follows from what has now been said that all
> evaluation of evidence takes place by the subsuming
> of actual facts under laws of general experience.
> Let us now return to the question why, at least on
> a first view, this does not seem to be the case,
> when, e.g., oral evidence is evaluated. As we
> have found, the court has to base its reasoning
> in these cases upon frequency relations which have
> a very indefinite degree of probability. ... As
> a rule, the court must try for itself to arrive
> at an opinion based on greater certainty by using
> available auxiliary facts. These, however, vary
> from one case to another, and their convincing
> force is equally difficult to ascertain. Where
> there are a great number of statements by witnesses
> and of other facts constituting evidence, the
> difficulties are increased. Under the principle
> of free valuation of evidence, the force of the
> evidence as to each particular theme of proof
> must be assessed on the absis of the available
> material as a whole. But in a case of the kind
> now discussed this material appears to be 'unique'
> in the sense that we possess no knowledge of any law
> of general experience concerning a complex of
> evidentiary facts of exactly that kind.[8]

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8. See Per Olof Ekelof, 'Free Evaluation of Evidence', (1964) 8,
Scandinavian Studies of Law, p 60.

The holistic analysis takes off from the realization
that judicial fact finding differs from scientific inquiries
in many important respects. It sees the factual aspects of
judicial inquiries as its dominant and most important part.
In this respect it is more like a discovery process, than a
process of justification in scientific inquiry. However, the
definition of the nature of the task presented by the total
heterogeneous evidence in the typical judicial fact finding
context, as distinct from the actual performance of that task,
admits of and is susceptible of logical analysis. I am quite
aware of the fact that the assertion that the discovery process
is susceptible of logical analysis is unacceptable to the
scientific methodologist. But as I hope to argue this is
possible in judicial inquiries because both the aims of these
inquiries and their nature are different from scientific inquiries.
In this sense I am not strictly following the distinction between
discovery and justification as is understood in the philosoophy
of science. In the following section I shall sketch an account
of the distinction between discovery and justification as is
used by the methodologists of scientific discovery. I will
also advance some arguments against the strict adherence to that
distinction in the examination and analysis of judicial evidence
and judicial fact finding processes.

B.   Discovery and Justification.

The distinction between the discovery of a theory and its
justification is well established in the philosophy of science.[9]
However to say this does not suggest that the implications of that
distinction are acceptable to all philosophers of science.[10]   What
is important for our present purposes is that the distinction is made
and seen by many philosophers to serve an important methodological
role for the philosophy of science.   The current controversies in
the philosophy of science as to whether the distinction is valid
or can be made to serve any rational purpose for the philosophy of
science need not concern us here.[11]   The distinction is meant to
separate two stages in the process of scientific discovery.   The
first stage is generally referred to as the stage of inventing or
thinking out a theory.   That stage is over when a 'finished
research report' of that theory is presented.[12]   The second stage
starts where the first ends.   The main object of making the
distinction is to determine the stage at which the genuineness of a
theory and its claim to account for and explain not only the data

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9.   See L. Laudan, Science and Hypothesis, (1981) ch. 11, pp 181 et.seq;
P. Medawar, Pluto's Republic, (1982) pp 28 et.seq, and 75 et.seq; K.
Popper, The Logic of Scientific Discovery (1959) pp 31, 107-11; see
also N. MacCormick, Legal Reasoning and Legal Theory, (1978) esp.
pp 15-6, 88.

10.   See generally n.9 above, see also L. Laudan, Progress and its Problems,
(1977); see I. Hacking, (ed.) Scientific Revolutions (1981-3)

11.   See nn. 9 and 10 above; see also T. Kuhn, The Structures of
Scientific Revolutions (1962).

12.   L. Laudan, Science and Hypothesis, (1981) 181, and 184-5; I. Lakatos,
The Methodology of Scientific Research Programmes, (1978) Vol. I, pp 10-11
and 14-6.

in its genesis but all other data which its logical conclusions are meant to explain and account for.[13]   In short it is the isolation of that part of a scientific inquiry which is susceptible of logical analysis.[14]   Again the manner in which the logical testing is carried out (eg. inductively or deductively), what it aims to achieve (verification, confirmation, or falsification) is not of direct relevance for our present purposes.   My main concern is to explain clearly the usual distinction between discovery and justification in order to specify exactly the meaning I shall assign to the two terms in this context.   This caution is called for because one of my main arguments is that judicial inquiries are process inquiries; and that that process involves both logical and psychological tasks. To most philosophers of science such an argument, if left unexplained, would not only be unfashionable but palpably wrong.[15]   For these philosophers to talk about a discovery process is to talk about what is irrational, illogical, or at best non-logical.[16]   But none of these epithets, I hope, applies to the logic of discovery in judicial inquiries, since the proposed logic has no justificatory function. This I will elaborate on later.

The present position should also be distinguished from that of the early empirical methodologists (e.g. Bacon, Locke and John Stuart Mill) who believed that scientific discovery is merely concerned

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13. L. Laudan, Science and Hypothesis, p. 189; K. Popper, op.cit. 32-3.

14. See K. Popper, op.cit. pp 27, 30, see also R. Carnap, Logical Foundatic of Probability, (1951) passim.

15. K. Popper, op.cit. p 31.

16. L. Laudan, Science and Hypothesis, ch. 11; P. Medawar, op.cit. p. 102.

with establishing empirical laws from infallible observations and that science proceeds from individual observations to general laws.[17] Apart from the fact that the process-logic I am proposing here is not justificatory it is not in any sense meant to describe, regulate, control, determine or analyse the subjective beliefs of the fact-finder. It is true that it defines the task of the fact-finder, but it does not control its performance. This is quite consistent with my rejection of the atomistic analysis which has its intellectual underpinnings in that philosophy whose commitment to a psychological and cognitivist conception of knowledge has already been discussed. However the simplistic view of scientific inquiries held by empiricist philosophers is probably one of the closest analogues to the nature of judicial fact finding inquiries: a fact which may explain the emulation of its methodologies and conceptual frameworks by most theorists of evidence and proof.[18] It probably explains also their adoption and attempts to justify one of its main assumptions; that of the infallible empirical base.[19] The main challenge to that philosophy was presented by the enormous growth of scientific knowledge which generated many problems for both the scientist and the methodologist of scientific discovery.[20] The problem of demarcating what is scientific from what is non-scientific, of demarcating observational statements from theoretical statements, of deciding the possible basic statements for a theory, the selection from possible statements, statements which are favourable or un-favourable to the theory, all these problems can be seen as being

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17. _Ibid_. pp 189-90.

18. See above chs. 1, 2 and 3.

19. I. Lakatos, _oop.cit_ pp.12 et. seq. and 20 et. seq.; L. Laudan, _Science Hypothesis_, p 186.

20. I. Lakatos, _op.cit_. p. 14; L. Laudan, _Science and Hypothesis_, p. 186; K. Popper, _op.cit_ pp 34 _et.seq_.

generated by problems of scientific growth.[21]   It is true that the
realisation that it is not logically possible to infer general
statements from facts, together with the realisation that facts
cannot be conclusively established has added to the difficulties
of that approach, and led ultimately to the distinction between
discovery and justification.[22]

It can be seen that judicial fact finding inquiries face
no problems of growth because a fact finding report, though it may
be reached in the same way as a scientific theory, is very unlike a
scientific theory in the sense that its function does not extend
beyond the data upon which it is based.   For this reason fact
finding reports do not present a problem of growth similar to the
problems of growth of scientific knowledge.   Some are stillborn,
others are born to die immediately after their one specific unique
function is over.   The problem of demarcation is not serious in
judicial inquiries, and it is not generated by any problem of growth.
The logical problems are there: but they are there for any theory
to contend with.   There is no demand or need in judicial inquiries
similar to the need for deep-structure explanatory theories in
scientific inquiries.[23]

The above account is not meant to defend induction as a
method of discovery.   It is meant to demonstrate that the reasons
which convince the methodologists of discovery to shift to the post
hoc testing of theories are non-existent in judicial fact finding

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21.   J. Lakatos, op.cit. pp 20-2.

22.   L. Laudan, Science and Hypothesis, p 186.

23.   Ibid. ch. 11 esp. pp 186-7.

contexts, for the simple reason that judicial fact finding inquiries have problems which are basically different from the problems which face a modern scientific inventor.[24]

Our sketchy account has so far revealed that the scientific discovery process is generally equated with what goes into the mind of the inventor prior to the moment of hitting on a testable hypothesis.[25] In this sense it is a psychological process contrasted with the logical process of testing.[26] The discovery process is thus depicted as a mysterious and obscured process contrasted with a vivid and clear justification process. The following definition is a good example of such depiction.

> The term 'logic of discovery', like 'discovery' itself,
> is notoriously ambiguous. If one views the logic of
> justification as concerned exclusively with a study
> of the evidence relevant to the proverbial 'finished
> research report', then the logic of discovery – construed
> as dealing with development and articulation of an idea
> at every stage in its history prior to its ultimate
> ratification – has a very wide scope indeed. It would
> include an account of how a theory was first invented,
> how it was preliminarily evaluated and tested, how it was
> modified, and the like.[27]

What is relevant for our purposes is that the discovery process is associated with the psychology of knowledge, while justification is associated with the logic of knowledge.[28] This distinction is fundamental in one of the most currently popular scientific

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24. See above Section A.

25. See K. Popper, op.cit pp 30-2, 44; P Medawar, op.cit. p   ;   but see L. Laudan, Science and Hypothesis, pp 182-3.

26. K. Popper, op.cit. p 31.

27. L. Laudan, Science and Hypothesis, p 181.

28. K. Popper, op.cit. pp 30-1.

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theories, the hypothetico-deductive method.[29]   The following statement from Karl Popper is of particular significance to the evidence theorist

> Before I can elaborate this view (which might be called 'deductivism', in contrast to 'inductivism') I must first make clear the distinction between the psychology of knowledge which deals with empirical facts, and the logic of knowledge which is concerned only with logical relations.   For the belief in inductive logic is largely due to a confusion of psychological problems with epistemological ones.   It may be worth noticing, by the way, that this confusion spells trouble not only for the logic of knowledge but for its psychology as well.[30]

If the problems of judicial proof were to be treated as justification problems, they should be so treated only if there is a function for justification in judicial proof comparable to the function of justification in scientific discoveries.   This question can be answered without going into the difficult and subtle requirements of testing theories or hypotheses.   I will attempt to answer the question by seeking an answer to the following two questions: why is there a need for testing a scientific theory or hypothesis?   Is the empirical evidence required for testing a theory different from that involved in its genesis?[31]   In the light of the answers to these questions it would be possible to determine the relevance or irrelevances of testing in judicial fact finding context.   If the need for testing a theory arises mainly from the claim of a scientific theory to have universal application whenever its initial conditions are satisfied, then the relevant tests of a scientific theory can be seen to be wider than those of a judicial hypothesis.   This is so because a judicial

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29. Ibid., passim; W. Salmon, The Foundations of Scientific Inference (1966-71) p 21.

30. K. Popper, op.cit. p 30.

31. L. Laudan, Science and Hypothesis, p 189.

hypothesis is not a theory, and as such has no claim to universal application, or in fact any application to any other facts than those in its genesis. A scientific theory is tested with the object of determining its logical consistency and capacity to account for the data it was designed to account for, its empirical or non-empirical nature; its relation to other theories, and finally the correctness of its predictions.[32] It is submitted that of these four sorts of testing of scientific theories only the first applies to judicial hypotheses. The second and third sorts have no application, because a judicial fact finding hypothesis is not a theory. The last one which may be thought to be relevant to judicial investigations is not relevant for two reasons. The first of these reasons is that the conclusion on the evidence in a judicial fact finding context is confined to a unique and un-repeatable occurrence. The second reason is that the evidence which is used for testing a theory is different from the evidence used in its genesis.[33] In judicial inquiries there is only one type of evidence: that adduced before the fact-finder during the discovery process.

The above analysis is meant to support the thesis that judicial inquiry is analogous to the process of scientific discovery, its evidence is comparable to the evidence suggesting a theory, its process is mainly a discovery process. The distinctiveness of judicial fact finding inquiries calls for a methodological treatment of its problems which is not only different from the methodologies of both Pascalians and Baconians, but also from the accepted

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32. See K. Popper, op.cit. pp 32-3.

33. L. Laudan, Science and Hypothesis, p 189.

methodologies in the proper context of scientific discoveries.

C.   The Holistic Analysis

In the preceding discussion the concept of holism has been elucidated and explained.   It requires that both the authenticity and probative force of evidence reports should be a function of wholes or structures of evidence, and not a function of the individual elements of those wholes or structures.   The discussion also emphasises that reference to the "evidence as a whole" should be understood to refer to these wholes or structures.   The extent and complexity of the fact finding task in any particular trial context vary   with the nature and number of the structures of which the evidence consists, and the number of the ultimate propositions of which these structures or wholes are evidence.

For the purposes of holistic analysis the conception of spatio-temporal region (STR) is very important.   It is an analytical tool of the holistic approach which distinguishes that approach from the alternative atomistic approach and provides substitution for the nomological inferential basis of atomism. Since the facts on which the fact-finder works are either evidentiary or facts in issue, holism employs two spatio-temporal regions corresponding to the distinction between evidentiary facts and facts in issue.   In what follows I shall refer to the evidentiary facts spatio-temporal region as (ESTR) and to that of the facts in issue as (PSTR) (a fact in issue shall . be referred to as a probandum fact).   As we shall further explain each ESTR has a distinctive role to play in holistic analysis.

As has already been indicated, facts play an important role in holistic analysis.   The analysis of evidence within spatio-

temporal regions, does not only relegate the role of explicit
nomological standards to the determination of relevancy but provides
a standard of decision in which facts play an important role in
decision making.   It is true that the concept of STR can be very
indeterminate since it involves the two difficult and elusive
concepts of time and space and whatever is situated within such
region at any particular portion of time.   For this reason it
is important to provide a test which may render the concept
more definite.   The objective of holism in this regard is very
simple and specific: it attempts to delineate, out of infinite
space, a portion as an individual region and tries to ascertain
what existed within that region at a particular portion of time.
Any test offered to perform such delineation must take into
consideration the purpose behind such delineation as well as the
available means for its accomplishment.   If the purpose is, as
is meant here, to ascertain what is capable of being perceived
within a certain region at a particular point of time, the capa-
bilities of a perceptor in relation to that space and time provide
a feasible test.   The standard test should, therefore, be the
perception of an ideally situated observer in a position similar
to that of any alleged witness in relation to that region at the
particular past point of time, whose perception, if true, would
coincide with that of the similarly situated ideal observer.
Whenever the spatio-temporal region is ascertained in accordance
with this test, then, the alleged existence and juxtaposition of
objects and persons within that portion of space and at that
portion of time, the different relations, qualities as well as
their relevant activities form the subject matter of inquiry.
The fact-finder should perform various and different tasks in
relation to each independent spatio-temporal region.   His first

task is to view and survey the entire content of the region at the specific place and time in order to discern any incompatibilities or inconsistencies in relation to what the parties allege to have existed within that region at that time. His second task should consist in asserting the existence of those alleged contents of the STR which are both possible and capable of co-existence within that region without inconsistency or contradiction. His third task should be the selection from all co-existent and consistent contents of the STR those contents whose existence within that region coincides spatio-temporally with the existence of the probandum fact, and whether such coincidence is sufficient to establish the particular probandum fact. Finally the fact-finder should ascertain whether the established probandum facts satisfy the initial conditions of the legal rule in question.

The previous discussion concentrates on two types of STR. The PSTR and every ESTR which is alleged to co-exist with the PSTR and coincides in one way or another with the existence of the probandum fact within that region. The PSTR subserves an important fact finding function. It should help the fact-finder to select out of the various facts alleged to have existed within that region those which form consistent and compatible elements which may or may not include the probandum fact as one of its elements. An evidentiary fact on the other hand may have its STR outside its PSTR. Evidence which tends to establish motive, or preparation for the commission of the crime, or the possession of a stolen item, or the expression of an intention to commit the crime in question are good examples of these evidentiary facts. The time and space within which any of these facts may be alleged to have existed is often different from the time and space within which the probandum to which they relate is alleged to have existed.

Any items satisfying this description can be referred to as an independent ESTR. The role of the spatio-temporal region of such items is limited to the determination of the existence of whatever is alleged to have existed within that region and not its probative force, which must be the function of connections inside the PSTR to which they are related through the concept of relevancy.

The analysis of all the admitted relevant evidence within a spatio-temporal region must initially present what the parties allegations represent it to be. The parties, for example, may allege all or only part of the relevant evidence to have occurred within a single spatio-temporal region while they may allege the existence of some fact related to that region to have existed within independent spatio-temporal regions outside their PSTR. In a particular case there may be only one or more than one PSTR. The probanda may either have independent STR's, they may all share one common STR while others may have their distinct and independent spatio-temporal regions. The analysis of judicial evidence should take into account and present all these variations and differences so as to approach an approximation of what actually existed.

For the purpose of a diagrammatical representation of holistic analysis I suggest the employment of circles to stand for the different types of regions. A probandum region (PSTR) can be represented initially by a large circle containing the entire allegations of the parties. The evidentiary regions (ESTR) whether they be located inside the probandum region or outside it, can be represented by small circles. The connections which the parties

allege, and the appropriate body accepts in accordance with the

standards of relevancy can be represented by straight lines

connecting the independent ESTR with ESTR inside the circle and

the inner ESTR circles with others inside the PSTR circle.   In

most cases this representation is bound to contain contradictory

or inconsistent reported locations, juxtapositions, relations and

qualities of the alleged contents of the region in question.

The next important task of the fact-finder is to attempt the

resolution of the various conflicts which the first large circle

and its related smaller circles present.   His primary task at

this stage should consist of selecting from the alleged contents

of the various regions those which he believes to have actually

existed.   The nature of the task involved, and its performance,

depend on the type of the STR in question (whether it is a PSTR

or an inside ESTR or an independent ESTR).   The resolution by the

fact-finder of this type of difficulty shall be represented in a

second circle in which all the regions which are not selected by

the fact-finder to correspond to reality shall loose their small

circles.   The second circle represents what should be accepted

as a consistent region free from conflict and inconsistency.   In

all cases of direct evidence which must co-exist and coincide

spatio-temporally with the probandum, the determination within the

second circle should contain sufficient evidence for or against

the existence of the probandum.   However in the case of circum-

stantial evidence, whether it be inside or outside the PSTR, such

evidence may not be sufficient.   This is so since the items of

circumstantial evidence may either co-exist with the probandum

without coinciding with its existence in time and space, or may exist within independent spatio-temporal regions with no conflict or inconsistency with its existence at all. For this reason a third circle is needed in the case of circumstantial evidence to indicate the sufficiency or insufficiency of the evidence as the case may be.

A concept of STR which is roughly explained for the present purposes of this thesis, and which needs further refinement in the future, is a basic analytical tool of holistic analysis. With its help we can now attempt the analysis of some of the issues posed by the four types of cases given above. If we start from the last case (case 1V) then it can be seen that both logic and commonsense demand that J should not assert both q and p to be true or probable, because of the spatio-temporal incompatibility in relation to the probandum STR. The first and primary task for J is to resolve the conflict between q and p by accepting either of them or rejecting both but he should not accept both of them as true or probable in relation to U. The choice of any of these three options in our example is decisive since accepting q_1 entails the rejection of p and vis versa. Another reason for the decisiveness of the choice in our example is that the example involves direct evidence in relation to both U and not-U, the ESTR and the PSTR in each case coincide. For this reason the probative force of a true or probable item of direct evidence has sufficient probative force to prove the probandum to which it relates. A basic feature of this type of case is that its total admitted evidence divides into two wholes or structures (i.e. q and p). Each structure has

an archetypal image incompatible with that of the other. The
incompatibility is a spatio-temporal incompatibility: U and not-U
to which q and p are relevant cannot both occur at two places at
one and the same time.

The position becomes more complex in the cases where the
evidence consists mainly of circumstantial items which may be
alleged to be located wholly inside the PSTR, partly inside it and
partly outside it, or wholly outside it. In such a case the need
for some link inside the PSTR to connect the genuine and authentic
items of circumstantial evidence with the probandum is essential.

In any particular case more than one probandums may be
alleged. These facts may either be alleged to co-exist without
contradiction or inconsistency, or exist separately within distinct
and independent spatio-temporal regions where no spatio-temporal
incompatibility is at all possible. This is a position where the
evidence consists of more than one binary pair of structures or
wholes relating to a compound U (e.g. where U consists of U_1, U_2,
U_3.). For example U_1 may allege the existence of a contractual
relationship between plaintiff and defendant while U_2 may allege
a breach of that contractual relationship by the defendant, and
U_3 may allege a frustrating event. Both U_1 and U_2 constitute
the initial conditions for the application of a legal rule R.
Each of these conditions can be independent and unrelated to the
other except through the requirement of R. Where each of U_1 and
U_2 has its independent spatio-temporal region what is relevant .
and probative to either of them is not relevant or probative to the

other.   The need to establish both U_1 and U_2 for the purposes of

R should not be understood as a warrant for treating the evidence

of either as being relevant, in all cases, to the other or as a

justification for combining such evidence for the purpose of

proving either or both of them.

The set of U_3, as shall be shortly explained, reinforces

the need for a distinction between the satisfaction of the require-

ments of the application of substantive legal rules and what the

proof of those rules demand as necessary and sufficient conditions

for their application.   The establishment of U_3 (the frustrating

event) despite the establishment of the existence of a contractual

relationship and what normally amounts to its breach (U_1 and U_2)

explains away the effect of both U_1 and U_2 and consequently the

application of the substantive rule for which they are the necessary

initial conditions, and justifies the application of another

substantive legal rule.

The above analysis, though incomplete and tentative has the

merit of sufficiently indicating the different tasks involved in

judicial fact finding and the general frames for their performance.

It starts from the whole admitted evidence in any particular trial

and attempts to identify the conflicts and inconsistencies which

relevant evidence presents.   The fact-finder should resolve these

conflicts with the help of the various types of spatio-temporal

regions whose contents should, in order to be selected and accepted

as genuine, be consistent and free from contradiction and linked

directly with the probandum in question.   The relevant facts,

their meaning and role can be easily ascertained and distinguished

from genuine facts whose selection by the fact-finder entails

the rejection of other facts as ungenuine. The suggested

analysis also explains the distinction between genuine facts

which have no probative force within or in relation to a

particular spatio-temporal region and those which have such

probative or proving force. It also explains why evidence may

be relevant, genuine and probative without being sufficient to

establish the probandum to which it relates. It further

distinguishes the sufficiency of evidentiary facts to establish

a probandum fact which is a requirement of establishing these

facts from the sufficiency of established probandum facts to

justify the application of a substantive legal rule or rules.

The last category of sufficiency relates to the requirement of

the logical proof of a substantive legal rule by proving the

necessary and sufficient initial conditions for its application.

The proposed holistic analysis is meant as a substitute

for the traditional analysis of the rationalist scholars whose

entire approach and methodological techniques have been criticised

in part I and II of this thesis. I am quite aware of the fact that my

thesis in some important aspects runs counter to most, if not all, of the

intuitions of, and the received wisdom from the greatest known

minds in the Anglo-American evidence tradition. This realisa-

tion made my research both difficult and onerous. However, the

thesis can be judged on its own merits in the light of the

criticism it offers against the philosophical assumptions of

that tradition and its conceptions of the fact finding task and

the methodological techniques that tradition offers for the

performance of such tasks. My proposed method of analysis and its practical utility for both decision making and the elucidation of basic evidence concepts can be compared for the purpose of determining its plausibility with the traditional methods. Having said that, I must admit a feeling of apprehension and uneasiness for disagreeing with the scholars I regard with awe and deep respect. In that regard, I compare, if I may, my present position and apprehensions (with no claim or pretentions for any merit for myself or my work from such comparisons), to those of Francis Bacon when introducing his Novum Organum. Since the words he used in that context both capture my present feeling and aptly express my sentiments they may as well end this thesis.

> But whence can arise such vagueness and sterility
> in all the physical systems which have hitherto
> existed in the world? It is not certainly from
> anything in nature itself; for the steadiness and
> regularity of the laws by which it is governed
> clearly mark them out as objects of certain and
> precise knowledge. Neither can it arise from any
> want of ability in those who have persued such
> inquiries, many of whom have been men of the highest
> talent and genius of the ages in which they live;
> and it can, therefore, arise from nothing else but
> the perversness and insufficiency of the methods that
> have been pursued. Men have sought to make a verdict
> from their own conceptions, and to draw from their
> own minds all the materials which they employed; but
> if, instead of doing so, they had consulted experience
> and observation, they would have had facts, and not
> opinion, to reason about, and might have ultimately
> arrived at the knowledge of the laws which govern the
> material world.[34]

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34. Novum Organum., Lib., i. Aph. 41 (quoted by J. Playfair), op.cit., ch. 9 n 9.

APPENDIX I

GLOSSARY OF LOGICAL TERMS

<u>Analytic</u>.   Used of a proposition whose denial is self-contradictory.
Such a proposition is true either by virtue of its logical form alone
(in which case it is called a <u>logical truth</u>, or <u>logically necessary</u>)
or by virtue of both its logical form and the meaning of its constituent
terms.   An instance of a logical truth is "It is raining or it is not
raining"; an example of an analytic truth that is not a logical truth
is "All bachelors are unmarried."   Analytic propositions cannot be
false and are therefore said to be <u>necessary truths</u>.

<u>Antecedent</u>.   The part of a hypothetical proposition that precedes the
implication sign.

<u>Assertion sign</u>.   The sign ⊢, introduced by Gottlob Frege to indicate
in the object language that a proposition is being judged as true and
is not merely being named.   Some authors now use this sign in the
metalanguage to express that the formula to which it is prefixed is
a theorem in the object language.

<u>Attribute</u>.   Although it is now often used synonymously with "<u>property</u>,"
this term was traditionally confined to the essential characteristics of
a being.

<u>Category</u>.   A general or fundamental class of objects or concepts about
whose members assertions can significantly be made which differ from
those that can significantly be made about nonmembers of this class.

<u>Collective term</u>.   In traditional logic, a term that denotes a collection
of objects regarded as a unity.   An example is "the rockies."

<u>Completeness</u>.   The word "completeness" is used in varying senses.
In the strongest sense a logistic system is said to be complete if and
only if for any well-formed formula <u>A</u>, either <u>A</u> is a theorem of the
system or the system would become inconsistent upon the addition of <u>A</u>

(1) see P. Edwards, <u>Encyclopedia of Philosophy</u>, Vol. 5 (1967) pp 57 <u>et seq</u>.

as an axiom (without any other changes); in this sense propositional
calculus, but not pure first-order functional calculus, is complete.
In a second, weaker sense a logistic system is said to be complete
if and only if all valid well-formed formulas are theorems of the
system; in this sense both propositional calculus and pure first-
order functional calculus are also complete. In a third, and still
weaker, sense of completeness a logistic system is said to be complete
if and only if all secondarily valid well-formed formulas are
theorems of the system; in this sense the pure second-order functional
calculus and functional calculi of higher order are complete.

Conjunction. A binary propositional connective (&,.), usually read
"and," whose truth table is such that "A and B" is false when A or
B or both are false and is true when both are true.

Connective. A symbol that is used with one or more constants or
forms to produce a new constant or form. When the constants or forms
are propositional ones the connective is known as a propositional
connective (or sentential connective). The most common propositional
connectives are negation, conjunction, disjunction, implication, and
biconditional. They are classified as singulary, binary, etc., according
to the number of propositional constants or forms with which they
combine.

Consistency. A set of propositions has consistency (or is consistent)
when no contradiction can be derived from the joinst assertion of the
propositions in the set. A logistic system has consistency when no
contradiction can be derived in it. Two syntactical definitions of
the consistency of a logistic system are Alfred Tarski's, that a system
is consistent if not every well-formed formula is a theorem, and E. L.
Post's, that a system is consistent if no well-formed formula consisting
of only a propositional variable is a theorem. There is, in addition,
a semantical definition of consistency, according to which a set of

propositions (or a logistic system) is consistent if there is a model for that set of propositions (or for the set of all the theorems of the system). It must not be assumed that any of these definitions are equivalent; in any case where it is claimed that they are, a proof is required.

Constant. A symbol which, under the principal interpretation, is a name for something definite, be it an individual, a property, a relation, etc.

Contradictory. Two propositions are contradictory if and only if their joint assertion would be a contradiction. "All men are mortal" and "Some men are not mortal," for example, are contradictory propositions. Two terms are contradictory when they jointly exhaust a universe of discourse and are mutually exclusive. In the domain of natural numbers other than 0, for example, "odd" and "even" are contradictory terms.

Contraposition. In traditional logic, a type of immediate inference in which from a given proposition another proposition is inferred which has as its subject the contradictory of the original predicate. (It should be noted that a change of quality is involved in some cases.) Partial contraposition results in a new proposition that is the same as the subject of the original proposition; full contraposition results in a predicate of the new proposition that is the contradictory of the subject of the original proposition. The process of contraposition (whether partial or full) yields an equivalent proposition only when the original proposition is an A- or O-proposition; when it is an E-proposition traditional logicians allowed for contraposition per accidens (or by limitation)-that is, contraposition plus a change in the quantity of the proposition from universal to particular-claiming

that the proposition formed is equvalent to the original proposition.
The process of contraposition yields no equivalent proposition when
the original proposition is an I-proposition.

Contrary. Applied to two propositions that cannot both be true but
can both be false. "All men are mortal" and "No men are mortal,"
for example, are contrary propositions. Also applied to two terms
that are mutually exclusive, but need not be jointly exhaustive, in
a universe of discourse. In the domain of natural numbers, for
instance, "less than 7" and "more than 19" are contrary terms.

Contrary-to-fact (counterfactual) conditiona. A conditional
proposition whose antecedent is known to be false.

Converse of a relation (inverse of a relation). For any relation R,
the relation R* such that aR*b if and only if bRa.

Disjunction, exclusive (alternation). A binary propositional
connective, one possible interpretation of "or," whose truth table
is such that "A or B" is true if and only if one of the two propositions
is true and the other false.

Disjunction, inclusive. A binary propositional connective (V), one
possible interpretation of "or," whose truth table is such that "A or B"
is true in all cases except where both A and B are false.

Dyadic relation. A two-place relation.

Entailment. The relation that exists between two propositions one of
which is deducible from the other.

Equivalent. Used of two propositions that are so related that one is
true if and only if the other is true. Some authors also use this
term, as applied to sets, synonymously with "equipollent."

Existential import. The commitment to the existence of certain
objects that is entailed by a given proposition.

Existential quantifier. The symbol (E) or (∃), read "there exists." It is used in combination with a variable and placed before a well-formed formula, as in "(∃a)------" ("There exists an object a such that------").

Extension. Although often used synonymously with "denotation," this term is sometimes used to refer to the set of species that are contained within the genus denoted by a given term. In the first sense the extension of "men" is the set of all men; in the second sense it is the set of sets into which mankind can be divided.

Extensional. Used of an approach to a problem which in some respect confines attention to truth-values of sentences rather than to their meanings. Thus, a logic in which, for purposes of deductive relations, truth-values may be substituted for sentences is an extensional logic.

Formula. For a given logistic system, any sequence of primitive symbols.

General term. A term that is predicable, in the same sense, of more than one individual.

Iff. A common abbreviation for "if and only if."

Indirect proof (reductio ad absurdum). An argument which proves a proposition A by showing that the denial of A, together with accepted propositions B_1, B_2 ..., B_n, leads to a contradiction. Strictly speaking, this fails to prove the truth of A, since one of the previously accepted premises may be false; the force of the argument therefore rests on using premises that are far better established than the denial of A, so that the denial of A will be rejected and A accepted.

Induction. Among acceptable inferences, logicians distinguish those in which the joint assertion of the premises and the denial of the conclusion is a contradiction from those in which that joint assertion is not a contradiction. The former are deductive inferences;

inductive inferences are to be found among the latter.

Much has been written about the precise nature of inductive inferences, but few definite results have been obtained. It is likely that there is a wide variety of types of inductive inferences. Two quite different types are the inference from observational data to theoretical conclusions and the inference from the composition of a sample to the composition of a whole population.

Inference. Derivation of a proposition (the conclusion) from a set of other propositions (the premises). When the inference is acceptable the premises afford good reasons to assert, or render certain, the conclusion.

Intensional. (1) Used of an approach which in some respect considers the meaning as well as the truth-value of a formula. A characteristic of such systems is that some propositions in them are referentially opaque. Systems of modal logic are usually intensional systems.

(2) Used of a proposition that contains a referentially opaque part. Cf. extensional.

Intersection of sets (product of sets). The set of all the objects that are elements of all the sets a_1, a_2..., a_n (symbolized "$a_1 \cap a_2 \cap \ldots \cap a_n$").

Inversion. In traditional logic, a type of immediate inference in which from a given proposition another proposition is inferred whose subject is the contradictory of the other.

Judgment. (1) The affirming or denying of a proposition. (2) The proposition affirmed or denied.

Logical implication. The relation that holds between two propositions when one is deducible from the other.

Metalanguage. A language used to talk about an object language; a meta-metalanguage is a language used to talk about a metalanguage, and so forth. Derivatively, a proposition is said to be in the

metalanguage if and only if it is about an expression in the object language.

Modality. (1) The characteristic of propositions according to which they can be described as "apodictic," "assertoric," or "problematic." An _assertoric_ proposition asserts that something is the case; an _apodictic_ proposition asserts that something must be the case; a _problematic_ proposition asserts that something may be the case. This type of modality was called by the medieval logicians _modality sine dicto (de re)_.

(2) The characteristic of propositions according to which they can be described as "necessary," "impossible," "possible," or "not-necessary." Medieval logicians called this type _modality cum dicto (de dicto)_.

Modus _ponendo tollens_. An inference of the form "Either A or B; A; therefore, not-B." This type of inference is valid only if "or" is interpreted as exclusive disjunction.

Modus _ponens_. An argument of the form "If A then B; A; therefore, B." Some authors use the term to designate the rule of inference that allows arguments of this form.

Modus _tollendo ponens_. An argument of the form "Either A or B; not-A; therefore, B."

Modus _tollens_. An argument of the form "If A then B; not-B; therefore, not-A." Some authors use the term to designate the rule of inference that allows arguments of this form.

Negation. A singulary propositonal connective (⊣, ‾, ~, -), usually read "not," whose truth table is such that "not-A" is true if and only if A is false.

Null _set_ (empty _set_). A set with no members.

Object _language_. A language used to talk about things, rather than

about other languages.

Operator. A symbol or combination of symbols that is syncategorematic under the principal interpretation of the logistic system it occurs in and that may be used with one or more variables and one or more constants or forms or both to produce a new constant or form. Universal and existential quantifiers are the most common examples of operators.

O-proposition. In traditional logic, a particular negative categorical proposition. An example is "Some men are not mortal."

Ordered pair. For given objects a and b, the ordered pair (a,b) is the pair set of which one member is the unit set whose only member is a and the other member is the pair set whose members are a and b.

Petitio principii. Begging the question.

Predicate. Traditionally, the word or group of words in a categorical proposition which connote the property being attributed to the subject or denote the class which the subject is being included in or excluded from. The term is often extended, in contemporary works, to cover all words or groups of words that connote properties or relations in any type of proposition. Thus, in "All men are mortal" the predicate is "mortal."

Predication. The attributing of a property to a subject.

Premise. A member of the set of propositions, assumed for the course of an argument, from which a conclusion is inferred.

Primitive basis. The list of primitive symbols, formation rules, axioms, and rules of inference of a given logistic system.

Quantifier. An operator of which it is true that both the constant or form it is used with and the constant or form produced are propositions or propositional forms. Thus, an existential quantifier, when joined to a proposition or propositional form A, produces a new proposition or propositional form "($\exists$a)M."

Reductio ad absurdum.   The method of proving a proposition by showing
that its denial leads to a contradiction.   In this sense it is often
known as a reductio ad impossibile.

Relation.   This term is not adequately defined in traditional logic.
The failure to offer an adequate definition is symptomatic of the lack
of serious consideration, on the part of traditional logicians, of the
significant differences between categorical and relational propositions.
Augustus De Morgan and C. S. Peirce were the first logicians in the
contemporary period to study the logic of relational propositions.
Since their time this subject has become an important part of logic.
In contemporary works, particularly in works on set theory, a relation
is defined as a set of ordered pairs.

A relation R is reflexive if "aRa" holds for all a that are
members of the field of R, irreflexive if "aRa" holds for no members
of the field of R, and nonreflexive if "aRa" holds for some but not all
members of the field of R.   For example, "is a member of the same
family as" is a reflexive relation, "is not a member of the same family
as" is an irreflexive relation, and "loves" is a nonreflexive relation.

A relation is symmetric if for all a and b that are members of
the field of R, aRb if and only if bRa, asymmetric if for all a and b
that are members of the field of R, aRb if and only if not-bRa, and
nonsymmetric when "aRb" and "bRa" hold for some but not all a and b
that are members of the field of R.   For example, "is a member of the
same family as" is a symmetric relation, "is a child of" is an
asymmetric relation, and "is a brother of" is a nonsymmetric relation.

A relation R is transitive when for all a, b, and c that are
members of the field of R, if aRb and bRc, then aRc, intransitive when
for all a, b, and c that are members of the field of R, if aRb and bRc,
then not-aRc, and nontransitive when if aRb and bRc, then "aRc" holds
for some but not all of the a, b, and c that are members of the field

of <u>R</u>.   For example, "is a descendant of" is a transitive relation, "is a child of" is an intransitive relation, and "is not a brother of" is a nontransitive relation.

The foregoing classifications are said to apply to a relation in a set if the corresponding properties hold for all members of the field of a relation that are members of the set.   A relation is <u>connective</u> in a set if for all distinct <u>a</u> and <u>b</u> that are members of the set, either <u>aRb</u> or <u>bRa</u>.

The study of relational propositions has raised many philosophical issues-and has greatly influenced discussions of older issues-about the nature of relations.

<u>Synthetic</u>.   Used of a proposition that is neither analytic nor self-contradictory.

<u>Tautology</u>.   A compound proposition that is true no matter what truth-values are assigned to its constituent propositions.   Thus, "<u>A</u> or not-<u>A</u>" is a tautology, since if "<u>A</u>" is true, then the whole proposition is true, and if "<u>A</u>" is false, then "not-<u>A</u>" is true and therefore the whole proposition is still true.

<u>Term</u>.   Traditionally, the subject or predicate in a categorical proposition.   Some authors extend the word "term" to cover all occurrences of categorematic words or expressions which, although not propositions by themselves, are parts of a proposition.

<u>Transitive</u> relation.   See <u>relation</u>.

<u>Transposition</u>.   A rule of inference that permits one to infer from the truth of "<u>A</u> implies <u>B</u>" the truth of "Not-<u>B</u> implies not-<u>A</u>," and conversely.

<u>Truth-function</u>. A function whose arguments and values are truth-values. A compound proposition is said to be a truth-functional proposition if the connective that is adjoined to the constituent propositions to form the compound proposition has a truth-function associated with it. In such a case, since the only arguments of the function are truth-values, the truth-value of the compound proposition depends only on the truth-values of its constituent propositions.

<u>Truth-value</u>. One of two abstract entities, truth and falsehood, postulated in Fregean semantics to serve as the reference of true and false sentences. In many-valued logics other truth-values are introduced.

<u>Universal instantiation, rule of</u>. The rule of inference that permits one to infer from a statement of the form "Property $\underline{P}$ holds for all objects" a statement of the form "Property $\underline{P}$ holds for an object $\underline{a}$."

<u>Universal quantifier</u>. The symbol $\langle$) or ($\forall$), read "for all." It is used in combination with a variable and placed before a well-formed formula, as in "($\underline{a}$)------" ("For all $\underline{a}$,------").

<u>Universe of discourse</u>. Those objects with which a discussion is concerned.

<u>Valid inference</u>. An inference the joint assertion of whose premises and the denial of whose conclusion is a contradiction.

<u>Variable</u>. A symbol that under the principal interpretation is not the name of any particular thing but is rather the ambiguous name of any one of a class of things.

<u>Well-formed formulas</u>. Those formulas of a given logistic system of which it can sensibly be asked whether or not they are theorems of the system. In any particular system, rules are given that define the class of well-formed formulas and enable one to determine mechanically whether or not a given string of symbols is a well-formed formula of the system.

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