

Research Article

Logic for the document examiner

Marcel B. Matley*

National Association of Document examination, San Francisco, CA, USA

Abstract

Logic is applied to several areas of document examination, such as development of standards defining and refining terms and issues, and assessing one's own and an opponent's work product.

Introduction

This paper began as an outline for my presentation at the 2017 Conference of National Association of Document Examiners in New Orleans, LA, hosted by Adele Thonn. Initially, all I aimed for was to present several series of elementary questions to ask in order to evaluate either the violation of or adherence to correct rules of formal logic. These questions could be asked of an opposing examiner offering a report or testimony in a questioned document case, but one could also do the same for one's own report or testimony and thus preempt challenges from an opposing cross-examiner. However, I fell victim to the tendency of ideas to expand their application in practical reality and demand further development and scope for guiding the thinker's thoughts and work. As many authors have expressed it, one's thoughts take on a life of their own. Whether for the easing or augmentation of our labors, we can become the beneficiaries or victims of our own well intentioned mental endeavors. So I beg of you, good reader, to judge my efforts mercifully. I explain the cognitive experience to stir both your thoughts on putting my poor efforts to your best use and to inspire you to bless me kindly with your suggestions on how I can best develop the prospective applications of this initial adventure into logic for forensic examiners.

Having begun only as an outline for the talk, it was only meant to embrace the most critical rules for proper logic as applied to forensic examination. Almost on its own initiative it evolved also to suggest an outline for a complete proposal for a preliminary set of full standards for performance of the work in forensic document examination with logical necessities providing the guiding light. That some topics have more detailed notations than others and still more have only a title for a topic are the results of the way it developed. Topics that were more central to the discussion about logic as applied to document examination naturally ended up with more text and a fuller outline towards further and future development. That then required that references be added for each segment to assist individual readers in further studies into those issues that an individual might find critical for an immediate need in casework or for personal heightened interest in researching.

The primary practical consideration [1,2]

Our focus will be on the following three issues:

- i. Considerations of the present logical environment in forensics

will serve as necessary context for the discussion, but a proper survey of present practice will not be attempted.

- ii. We will consider aspects of formal logic that best serve needs of the handwriting expert and coincidentally be applicable to other forensic services.

- iii. As expert witnesses, we provide answers to practical problems that can be resolved into mostly fiscal terms for redress of claimed grievances [3,4].

Issues that specific relevance does not allow us to delve into are:

- i. Pointers for later private consideration and study; and
- ii. Suggestions for research and future work product

Select forensic journal papers and segments in forensic books are cited as examples of the literary wealth that treats, both pro and con, of the issues discussed herein. The bibliography hopefully offers an initial guidance also to views that I disagree with [5] and contend go off in a less than eventually fruitful direction, such as Biedermann, *et al.* [6].

In contradistinction to Biedermann, *et al.*, I highly recommend the paper by Imwinkelried [7]. I apply Aristotelian/Scholastic logic and pointedly ignore modern systems of alleged logic, such as symbolic logic.

Assessing the present logical environment in forensics

The later references to sophistries that courts of law have explicitly disapproved of will suffice for present purposes.

The essential services of our logic

We deal in categorical, contradictory statements; ex. gr.: Did decedent sign the will? Yes or No? Therefore, we are concerned mainly with rules of logic that apply to pairs of categorical, contradictory statements. Thus, we can reduce all questions and assertions to such pairs of statements with this assured quality: One must be true, and the other must be false.

Correspondence to: Marcel B. Matley, P.O. Box 882401, San Francisco, CA 94188, USA; Tel: 415-753-2832; Fax: 415-824-0806; E-mail: matleyhwexp@atol.com

Key words: logic, standards, terminology, case law, authorities, definitions, law of document examination, reasonable explanation, inconspicuousness, identification

Received: May 03, 2017; **Accepted:** May 26, 2017; **Published:** May 30, 2017

Therefore, we must render two opinions:

First opinion: Which of the pair is true (and, thus, which is false)?

Second opinion: How assured can we be of our opinion as to which is true and which false?

However, there may not be available the necessary physical evidence to support either alternative, so we might have to give a third opinion as to the fact of the matter as stated below. Before going there, let us take a brief glance down a forensic blind alley. Some say, other than the straightforward common sense query as stated above, “Did decedent sign the will—Yes or No,” we need to complicate things with “propositions.”

How we all went brilliantly astray

The nine-point terminology that we document examiners in America adopted conflates these two essentially related but specifically distinct opinions [8]. What is needed are two sets of terminology. For example, suppose we must examine a will about which it is disputed whether the decedent signed it or not. Only three terms are needed for expressing all opinions as to the expert fact at issue: Did decedent sign the will? We have only three possible opinions, best expressed unequivocally:

- i. Decedent did sign the will in dispute.
- ii. Decedent did not sign the will in dispute.
- iii. I do not have a technically viable opinion as to whether or not decedent signed the will in dispute.

For the opinion as to assurance, we have available five terms parallel to, but not necessarily identical in meaning to, the terms for legally required levels of proof in American trials:

- i. “Definite,” the legal parallel being “Beyond every reasonable doubt.”
- ii. “Very or highly probable,” the legal parallel being “Clear and convincing evidence.”
- iii. “Probable,” the legal parallel being “More likely than not.”
- iv. “Indications are,” the legal parallel being “Reasonable suspicion.”
- v. “Not technically identifiable,” is offered for the currently non-existent formal term. I do not know what the legally parallel term might be for there being no legally admissible proof possible.

Each term for expressing an opinion as to fact or assurance needs its own three notes:

- i. Precise definition of each term used. Presently, published statements gives descriptions as opposed to definitions developed by the Socratic method;
- ii. A set of unique, objective criteria for choosing each term versus any other;
- iii. Each criterion based on objective data developed to support the first two notes.

As stated already, subsequent versions of the standard nine-step terminology did nothing to enhance the scientific quality of the statement, mostly by avoiding a statement of objectively established and applied criteria for the selection of each term, particularly of measurable criteria [9,10]. At a minimum, this inexcusable lapse

can be easily remedied by requiring an assessment of how well the expert opinion satisfies the requirements of the legal rules and of any applicable forensic standards. A lack of specific citable standards should require a lowering of the statement of assurance the expert asserts, even unto zero. Joseph [11] explains masterfully why there is truly no non-opinion, since not giving either an identification or elimination of a suspect writer requires accurate and thorough observation of the relevant physical facts and correct application of the criteria for both an identification and elimination [12].

Divisions of logical studies

Material logic provides the rules to assure the truth of our statements. It is called material logic because truthful statements are the stuff of which correct and reliable logic is made.

Formal logic is so called because it gives us the rules for the order, shape, arrangement we must give to our arguments for them to be correct and reliable logic.

Dialectics, for our purposes, is dialogue or discussion to clarify thought, principally the scholastic tradition of precise definitions of the words we use. This pursuit of precise definitions is the heart of the Socratic method, because Socrates asked people questions to get them to be precise in what they meant to say. Also, *Dialectics* sometimes means putting our argument in an attractive dress that appeals to some bias rather than exact, scientific reasoning.

Rhetoric is skill at argumentation, presenting and defending one’s opinion or thesis principally to persuade others. The Aristotelian concept of forensics is public debate to persuade by skill of argumentation and by subjective appeal to value system versus appeal to scientific evidence presented solely by objective considerations. Our ideal of forensics is argumentation and persuasion which is as scientifically flawless as it can be done in the circumstances.

Critique is often thought to be merely criticism, even caustic or sarcastic criticism. It is, however, a reasonable evaluation of another’s argumentation. It is also called “critical commentary,” “critical reasoning” or “critical analysis.”

Ad hominem argumentation is Latin for an argument directed “at the human,” or, colloquially, an attack against the messenger versus the message, against the opponent personally rather than the opposing opinion. An example a colleague provided was that an opposing document examiner said she had given a correct opinion but was not qualified to do so.

Sophistical argumentation, simply put, is the study of various kinds of false arguments and how to refute them. The sophist is an intellectual bully who uses tricky and phony arguments to pick on those who are less clever in the way a physical bully uses greater strength to pick on weaker folk.

The best introduction I know of to Aristotle, including basics of his logic, is by MJ Adler [13]. If you wish to dive into the deepest end of the logical swimming pool, you would go for the several books of the *Organon* by Aristotle available in various collected works, such as McKeon [14]. I myself have stayed in the wading pool.

Logical requirements of the law

Courts have on occasion discussed why the logic that attorneys and expert witnesses use is either valid or invalid. I know of no comprehensive and systematic treatise on this topic. However, in

Testing the Reliability of Expert Opinions in Texas, Matley [15], a number of logical fallacies are given which courts have identified and discussed. One function of logic is to establish the foundations for each required nexus. In this context, nexus means the truth connections among items of evidence and principles of law. The major sources of a nexus are:

- i. Observation and demonstration of relevant physical facts;
- ii. Explanation and justification of one's methodology;
- iii. Explanation and proper application of theories by which facts are interpreted; and
- iv. Performance of any needed reliability test.

These days the last item is sadly reduced mostly to a so-called "peer review," whereby the reviewer simply mirrors exactly what the original examiner did. Naturally this ensures the exact same result no matter how excellent or flawed. Matley MB *Reliability Testing of Expert Handwriting Opinions* [16], supplies a rich array of methods both to test one's own conclusions and opinions and to challenge the reliability of an opposing expert opinion.

The law of expert witnesses

The work product of expert witnesses must conform to applicable statutes and rules and to the applicable interpretations and principles given in the relevant case law. These are also the guidelines for the refutation of misinterpretations and misapplications of law. Professor Risinger's agony and futility in undertaking this effort is described in his *Tulsa Law Review* paper cited elsewhere herein [17]. I resist the temptation to say the description is somewhat charming.

When I credited Professor Risinger as holding the opinions of most other critics of forensic evidence, I did him an injustice. He has voiced criticisms I have of them but in a more succinct and erudite manner. Additionally, I find his criticisms of forensics mostly persuasive and well balanced with commendable suggestions for improvement. His compilation of cases in *Tulsa Law Review* inspired me to a complete revision of my own compilation [18].

Further considerations of problems with modern theories of logic

Endeavoring to discover a logical logic among modern texts on logic, I concluded:

- i. Theorists misunderstand basic principles of Aristotelian logic;
- ii. They give no, to hardly any, consideration to material logic;
- iii. They operate from a flawed epistemology; and
- iv. Their logical methods are a complexity born of unresolved perplexities.

Since this present paper's focus is principally on the positive and effective uses of logic in forensics, let us pass on to sources of constructive applications.

What constitutes a reasonable explanation

According to Hilton [12], if a suspect is identified as a writer of a questioned text, but if there is a significant difference between the suspect's exemplars and the questioned writing, a reasonable explanation for the difference is needed for the identification to stand. First of all, "significant difference" and "reasonable explanation" need

concise definitions and precise criteria to assure we have established the former and created the latter [16]. The principle criterion for a reasonable explanation is that it is based on relevant physical facts that are observable, demonstrable and verifiable. The key criterion for a trait being significant for identification is that it is inconspicuous [19].

Interpretation of facts by proper theory

These criteria are essential for a reasonable explanation and can be accomplished in various ways:

- i. Better application of previously cited theory;
- ii. Development of additional theoretical support;
- iii. Correction, enhancement or enrichment of previously used logic;
- iv. Additional or enhanced demonstrative evidence;
- v. Previous opinion(s) corrected; or
- vi. Compensation provided for a previously unrecognized lack

There seems to be a sad lack of a reliable instruction as to precisely how to discover and apply relevant traits accurately and logically. My experience has been that handwriting experts are most expert at how to state with aplomb the alleged explanation with both full self-assurance and a poverty of physical facts and a testable theory.

I mainly rely on Hilton [12] for my statement of theory and method for making either an identification or elimination of a suspect as the writer of a questioned signature or handwriting. He clearly explains the need for a reasonable explanation to support an identification, but I have not found a passage providing the criteria that make an explanation reasonable, though I believe he illustrates the same [19-22].

Kumho alternative for another reasonable set of criteria

Kumho allows for the trial judge to permit use of a different set of criteria for proving reliability of proffered expert evidence in the particular circumstances, if that is the more reasonable alternative. However, *Kumho* provides no criteria for establishing either that *Daubert* factors are not reasonable or that the alternative factors are. It is suggested this might be the way to do so:

- i. Verify whether or not the *Daubert* factors can do the job;
- ii. If not, resort to an alternative set of factors provided you can justify it legally;
- iii. Determine whether or not any *Daubert* criterion is somehow inadequate;
- iv. If so, offer proof that the proposed alternative is technically satisfactory;
- v. Cite any court decision that approved the alternative; and
- vi. Present technical or scientific evidence in support of the alternative proposal.

I do not recall coming across a case report on this issue or a published discussion of it in the professional literature. The above six points seem to me to be the minimal, reasonable guidelines to justify an alternative set of criteria to those in *Daubert*. Who can review all of the massively tiresome literature on almost every aspect of *Daubert*/*Kumho*/*Joiner*? I, maybe arrogantly, add what I believe to be a nearly neglected aspect of it, the thesis that the truth of relevant, observable,

demonstrable and verifiable physical facts should be the deepest and most essential foundation of the structure of any court trial involving an expert fact at issue [23,24].

The main, specific logical methods we utilize seem to be these:

i. *Disjunctive argumentation* which colloquially is called either/or argumentation. An example of a disjunctive question is: "Were you at your assigned post when the attack occurred or were you elsewhere?" A properly created and executed series of disjunctive questions will herd a witness into admitting an uncomfortable fact.

ii. The *dilemma* which is a special type of disjunctive argumentation where the two alternative possibilities prefaced by "either" and "or" lead to the exact same undesirable outcome for the opponent rather than one of two undesirable outcomes. A course in linguistic examination of a statement claims it can demonstrate dishonesty, and thus unreliability, in the statement. It is easily proved by its own statements to be unreliable. If one agrees its thesis is not reliable, then one must hold that it is unreliable. If, on the other hand, one holds its thesis is reliable, then one must hold its thesis is unreliable. Why? Each characteristic of a statement that the thesis claims is evidence of unreliability is a linguistic characteristic of the course itself. However, I have not heard of use being made of this conclusive proof of the course's unreliability.

iii. *Conditional or hypothetical argumentation* is characterized by three statements introduced with "If...But...Therefore." This can be the trickiest argumentation whereby a party using it can seem to have impeccable and unanswerable logic, while actually failing to prove what must be proved. Why? Everything depends on the truth of every assertion made in the "If" statements. By the time the trial ends, the victim of the hypothetical argument forgets to verify whether every hypothetical assertion has indeed been proven, while its proponent continues to talk as if everything has been proven that must be proven. Additionally, the hypothetical question might be beyond the witness's memory and intelligent grasp. In one case report, a series of hypotheticals covered more than a full page, but the opposing counsel never tested the witness's claim that he indeed perfectly recalled and bore them all in mind while answering the entire question.

Stray thoughts on creating a proper set of standards for performance

Logic tells us to begin a complex operation with a suitable plan that is logically arranged. At least in questioned documents, the several efforts at compiling established standards for all aspects of document examination and adhered to by all document examiners have been highly illogical and also haphazard in the sequence in which topics were addressed.

The first essential of such a project is to write a complete outline of the activities in forensic document examination. This outline can be arranged according to the time sequence in which steps are to be taken or in accordance with the priority of importance that the various tasks have among themselves. There must be some rational, organic interrelation among the individual topics which each will be treated by a single written standard.

Next, those creating the compilation embracing the final complete set of standards should gather copies of all existing standards which will serve as models for the good features they exhibit and a corrective for the poor features to be avoided. Technically related material should be gathered from disciplines that control or contribute to document examination and those that have related activities or interests. The

relevant rulings from courts of law should be tacked down and compiled for the legal and technical guidance they might hold. Last of all the professional literature should be surveyed for teachings that offer guidance in best practices and instructions to be had historically from any reasonable source.

At the end, it would simply be a matter of ranking all issues according to which are of most immediate importance and which are best taken in a systematic, topical or functional sequence.

Each standard would provide references to pertinent related disciplines.

The last and the least

The issue we consider now, though the first in order of logic, is often not even last in consideration, not being considered at all. Identification/Elimination is the central technical answer document examiners provide, especially as handwriting experts. Where are the generally accepted definitions of and criteria for "identification" and "elimination"? Nowhere.

Where are the generally accepted theory and set of criteria for an identification and for an elimination? Nowhere that I could find, though Ordway Hilton gave the best start in his 1982 text [12].

Reliability Testing of Expert Handwriting Opinions, previously cited [14], provides technical definitions of several central terms in forensic document examination. For example, from page 34: "3.1.1 We can define an expert identification or non-identification as a probable or better conclusion, either positive or negative, based on verifiable and significant notes, supported by established scientific theories and findings, and subject to demonstration.

"Significant for identification" and related terms are defined thus on pages 36-37:

"3.2.2 The nature of identifying notes. A note can be defined as an observable, verifiable and characteristic trait significant for identification. By 'observable' is meant something that can be seen, described, tabulated and reported. By 'verifiable' is meant something that another person can see, describe, tabulate and report with the same results as the first person obtained. By 'characteristic' is meant something which appears repeatedly or in a pattern with other things or in a singularly unique manner. By 'trait' is meant what can be specifically defined as belonging to a class of empirically predetermined features subject to rules of observation and principles of interpretation.

"The term 'significant' is much harder to define. No author, whom I have read and who mentions the need for significant traits in identifying handwriting, defines the term and discusses what factors make a trait significant. The exception is Robert Saudek, who, without using the term, states precisely which traits he considers significant and insignificant for identification and why. 'Significant' means a thing which either should contribute positively to the identification of a writer or must be reasonably accounted for if it does not, because experimentally established theory indicates it should be consonant with authentic writings. Saudek says that the inconspicuous features are those significant for identification. Inconspicuous features in handwriting are those which experimental research has shown escape the attention of the writer unless pointed out to him or the writer is asked repeatedly to notice another feature."

The above paragraph mistakenly understates Saudek's views which a reading of the book, *Experiments with Handwriting*, would

demonstrate. Forms of the words “conspicuous” and “inconspicuous” are used at least 120 times in the text. However, all else stated is, as the British say, spot on!

Saudek provides a scale of more or less conspicuous features and gives the experimental confirmation for the scale [25].

References

1. Maritain J (1946) An introduction to Formal Logic, translated by Imelda Choquette. New York, Sheed & Ward.
2. Zegarelli M (2007) Logic for dummies. Hoboken, NJ, Wiley Publishing.
3. Case law: in <https://scholar.google.com/>
4. U.S. v Jones (1997) 107 F.3d 1147 (6 Cir 1997); cert. denied, 117 S.Ct. 2527.
5. Found B (2016) The Modular Forensic Handwriting Method 2016 Version. *Journal of Forensic Document Examination* pp. 7-83.
6. Biedermann A, Bozza S, Taroni F (2008) Decision theoretic properties of forensic identification: Underlying logic and argumentative implications. *Forensic Science International* 177: 120-132.
7. Imwinkelried, Edward J (1998) Bases of expert testimony: the syllogistic structure of scientific testimony.” Among the handouts on the flash drive. *North Carolina Law Review* 67: 1-27.
8. McAlexander TV, Beck J, Dick RM (1991) Standardization of handwriting opinion terminology. *Journal of Forensic Sciences* 36: 311-319.
9. Osborn AS (1935) Reasons and reasoning in expert testimony. *Law and Contemporary Problems* 2: 488-494.
10. Stein EW (1930) “Handwriting, Typewriting and Document Expert Testimony Tested by its Convincingness.” Among the handouts on the flash drive. *Journal of Criminal Law and Criminology*. 21: 330-338.
11. Joseph JA (1997) The Unidentifiable Handwriting: an Anonymous Note Case. *Journal of the National Association of Document Examiners* 20: 1-5.
12. Hilton O (1982) Scientific Examination of Questioned Documents. Revised edition. New York, Elsevier.
13. Adler MJ (1978) Aristotle for Everybody: Difficult Thought Made Easy. New York, Macmillan Publishing Company, Chapter 17, “Logic’s little words,” 139-150.
14. McKeon R (1941) editor, *The Basic Works of Aristotle*. New York, Random House.
15. Matley MB (2004) Testing the Reliability of Expert Opinions in Texas: Guidelines from Kelly, du Pont/Daubert and Their Progeny. San Francisco, CA, A & M Matley. Open access at Internet Archive:
16. Matley MB (1992) Reliability Testing of Expert Handwriting Opinions. San Francisco, CA, Handwriting Services of California.
17. Risinger MD (2007) “Goodbye to All That, or a Fool’s Errand, by One of the Fools: How I Stopped Worrying about Court Responses to Handwriting Identification (and ‘Forensic Science’ in General) and Learned to Love Misinterpretations of Kumho Tire v. Carmichael. APPENDIX: Cases Involving the Reliability of Handwriting Identification Expertise since the Decision in Daubert.” *Tulsa Law Review* 43: 447-595.
18. A & M Matley (2013, 2016) Admissibility of Handwriting Expertise: a Survey of Post Daubert Cases.
19. Lee G-K, et al. Journal of the American Society of Questioned Document Examiners. 9:29-36, June 2006 “A study on the levels of difficulty in the simulation of individual characteristics in a signature.”
20. Osborn AS Questioned Documents, Second Edition 1929 Chicago Nelson-Hall Reprint of 1929 edition, Monclair NY Patterson Smith Publishers.
21. Kelly JS, Lindblom BS (eds.) (2006) Scientific Examination of Questioned Documents. Boca Raton, FL, CRC, Taylor & Francis.
22. Miller L (2007) Scientific examination of questioned documents. Second edition. *Journal of Forensic Document Examination* 18: 81-4.
23. Sapir A (1996) Laboratory for Scientific Interrogation. The L.S.I. SCAN Workshop Guidebook; Scientific Content Analysis (SCAN). Phoenix, AZ, The Laboratory.
24. Kumho Tire Co. vs. Carmichael, 143 L Ed 2d 238 (U.S. 1999) “[W]hether Daubert’s specific factors are, or are not, reasonable measures of reliability in a particular case is a matter that the law grants the trial judge broad latitude to determine. See id., at 143, 139 L Ed 2d 508, 118 S Ct 512. The Eleventh Circuit erred insofar as it held to the contrary.”
25. Saudek R (1929) Experiments with Handwriting. London, George Allen & Unwin, Reprint: Sacramento, CA, Books for Professionals, 1978.

Copyright: ©2017 Matley MB. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.