

THE CONCEPTUAL CHALLENGE OF EXPERT EVIDENCE

EL DESAFÍO CONCEPTUAL DE LA PRUEBA PERICIAL

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RECIBIDO EL 05 DE JULIO DE 2013 Y APROBADO EL 12 DE SEPTIEMBRE DE 2013

RESUMEN ABSTRACT

Se examina la relación entre el conocimiento experto y la forma de los juicios. En su mayor parte, los juicios son eventos educativos en los que se espera que el investigador de hechos pueda comprender, procesar, y deliberar sobre la evidencia, y como resultado llegue a conclusiones racionales. Este proceso refleja la importancia fundamental de la exactitud de los hechos en el juicio, sin el cual los derechos y las obligaciones son esencialmente un sin sentido. La prueba pericial a menudo implica una deferencia en lugar de un modo educativo de procedimiento y en esa medida puede estar en la oposición a las aspiraciones de los juicios normales. El cómo y el por qué de este desarrollo se discute, como sus consecuencias. La alternativa avanzada es que todas las pruebas deben presentarse en una modalidad educativa si las aspiraciones de los juicios se han de realizar. Si la evidencia no puede ser presentada de una manera tal, entonces la cuestión de la que la evidencia es pertinente plausiblemente no puede ser litigada en consonancia con las aspiraciones normales de los juicios.

The relationship between expert knowledge and the form of trials is examined. For the most part, trials are educational events in which the investigator is expected to comprehend, process, and deliberate on the evidence, and as a result to reach rational conclusions. This process reflects the fundamental importance of factual accuracy at trial, without which rights and obligations are essentially meaningless. Expert evidence often involves a deferential rather than an educational mode of proceeding and to that extent can be in opposition to the normal aspirations of trials. The rationale of this development is discussed, and so are its consequences. The alternative advanced is that all evidence should be presented in an educational mode if the aspirations of trials are to be realized. If evidence cannot be presented in such a way, then the matter to which the evidence is pertinent cannot plausibly be litigated in accordance with the normal aspirations of trials.

PALABRAS CLAVE

testimonio de expertos, evidencia, sistema jurídico liberal, derecho, reglas de la prueba, juicio.

KEY WORDS

Expert testimony, evidence, liberal legal system, right, rules of evidence, trial.

The law of all countries of which I am aware contain relatively complex taxonomies of the types of information that conceivably may be pertinent to the resolution of a legal dispute. For example, American evidence law refers to scientific, technical and other specialized knowledge. (Federal Rules of Evidence (FRE) 702) The *Federal Rules of Evidence*, compounding the complexity, go on to specify various ways in which a person might become an expert, which involves the acquisition in any manner of “knowledge, skill, experience, training, or education” that may “assist the trier of fact to understand the evidence or determine a fact in issue.” (FRE 702) If at least one of these criteria is met, an expert may express opinions or otherwise comment about the issues in a case, so long as the expert does so more or less consistently with the standards of the particular expert’s field of knowledge.

The suggestion in the *Federal Rules* of significant epistemological complexity because of the numerous forms of knowledge that might be pertinent to resolve a dispute is matched if not exceeded by complexity in practice. Enormous resources are spent analyzing and critiquing an apparently endless list of purported forms of expertise to determine the admissibility of testimony, to ensure that the expert is indeed going to testify on the basis of knowledge of some sort or another. If so, the expert is allowed to testify, but is not required actually to testify to that specialized knowledge. Instead, the expert may offer an opinion based on that knowledge about material propositions in the case. (FRE 702, 703) Unfortunately, opposing experts can do the same thing – and normally if there is not an opposing expert there is not a triable issue. Thus, after all the effort put into regulating expert testimony at trial, the trier of fact might find itself with two opposing opinions about what to do about matters that are beyond the knowledge of the typical fact finder.

The picture I painted above is odd in many respects. It suggests that there are critical differences between different forms of knowledge, that those differences can be accommodated for trial purposes by taking an internal perspective on the evidence being offered, and if that passes muster letting the expert opine about the relationship between the expert’s field and the issues being tried. This is odd because each of these propositions is high problematic, and collectively, while conventional, are quite counterproductive

to the central purpose of trial. To justify that assertion requires that the central purpose of trial be identified, that the regrettable consequence of the conventional approach to expert testimony on that purpose be identified, and an alternative offered. I discuss these three points in turn below.

The fundamental aspiration of liberal legal systems

There is much handwringing and angst about the purposes of trial, especially I think in those jurisdictions with juries which may increase the possibility of a verdict against the law (*Cf.* Burns), but trials without reasonably accurate fact finding are pointless. They are worse than pointless; they are destructive of the foundations of liberal societies. The justifications of trials that neglect the significance of accurate fact finding are uniformly influenced by the misconception that the fundamental political insight of the Enlightenment, and thus the critical element upon which modern western governments rest, has something important to do with rights and obligations. Discussions of the political philosophers from Montesquieu to Rousseau are quite prevalent in legal scholarship. Trials bear upon this because they can be the vehicle by which various rights can be exercised, such as the right to be heard or to confront or resist. An individual can defy government directly by appealing to the common sense and humanity of a jury to acquit regardless of the law, goes the epitome of this somewhat heroic vision.

Obviously rights and obligations are important and necessary, but they are not sufficient. The more fundamental contribution of the Enlightenment was the epistemological revolution that supplanted dogmatic knowledge with empirical knowledge. It replaced knowledge as the doctrines of the secular and political authorities with the concept that the world external to our mind may be known objectively through evidence.¹ It is not an exaggeration to say that without accurate fact finding, rights and obligations are meaningless, and thus it is not an exaggeration to say that the most critical component of modern western civilization is accurate fact finding.

¹ A good introduction is Enlightenment, Stanford Encyclopedia of Philosophy, available at <http://plato.stanford.edu/entries/enlightenment>.

Consider first the heroic vision of jury nullification. It is literally meaningless without generally accurate fact finding, with the case of nullification being the exception that proves the rule.² The point presses considerably more deeply, however. Examine any example of a right and it becomes immediately apparent that it is parasitic upon its epistemological foundation. Consider what was originally and still is one of the most fundamental rights in the West, the right to property. To make the exercise concrete, consider the simple case of ownership of your cell phone. Your ownership of a cell phone allows you the “right” to possess, consume, and dispose of those assets, but suppose I walk up to you and grab what you say is your cell phone and refuse to return it, claiming that it is mine. What will you do? You will go to someone with the power to adjudicate rights, to be sure, a judge or a jury, but what will you do next? Demand the return of your cell phone, which I will then claim is really mine not yours? No, of course not. You will present evidence about how you came into possession of that cell phone, by presenting a receipt or a bill from the phone company that associates you with that cell phone. Then you might turn it on and demonstrate all kinds of things that would convince a reasonable person that it is your cell phone rather than mine, such as text messages or emails addressed to you and none to me, and so on.

If successful in this effort to show the facts, the decision-maker will grant you the right to possess, consume, and dispose of the cell phone —return it to your possession, in other words— and that will impose upon me reciprocal obligations. But here is the absolutely critical point: the right to property is completely and utterly dependent upon the facts that are found and are derivative of them. This point cannot be overemphasized, and it inverts the conventional conception of the relationship of facts and rights. Facts determine rights and obligations. Whoever finds the facts determines the meaning and scope of a right, whether it is the right to property or the right to life.

A potential skeptical note — even if fact finding is important in the way I have described, isn’t it a rather large stretch to suggest that it is one of the most fundamental planks of modern liberal

² It also neglects that a jury that can acquit against the law can equally well convict against it (Cf. Green).

democracies? Not only is it not a stretch, but the success of the western democracies is intimately tied to this set of juridical arrangements. Tightly binding the rule of law to true states of the world anchors rights and obligations in things that can be known and are independent of whim and caprice. The right to the enjoyment of property does not depend upon the good graces of fallible human beings, or on their moods or prejudices. You do not have to be in someone's favor to possess a house or travel on a vacation or raise your children in the manner you think best. Quite to the contrary, these rights are grounded on things that have an existence outside the mind of any particular human being and that, as the great Enlightenment epistemologists saw,³ can be proved with a high degree of regularity by evidence that itself tends to exist without regard to the mind of any particular individual.

In addition to securing rights for their holders, grounding rights on facts permits people to negotiate around them in many different and important senses. Rights grounded in facts provide clear landmarks for both the holder and others, informing everyone of the legal potentiality and limits of rights. Choices can be made and lives planned with greater security with such knowledge. Equally important, the secure foundation of rights makes possible the emergence of markets in them – they can be alienated in the various ways permissible within market a economy – which has led to the astonishing growth of wealth in those parts of the world that adhere to such commitments.

To be sure, sometimes evidence is lacking and other times mistakes can be made, but normally the progression of the world leaves very traceable marks that permit the reconstruction of the past that is more than adequate to establish the past for the purpose of adjudicating the present. This is why, notwithstanding the complaints about ever increasing litigiousness, modern life works so amazingly well. It is why you can buy and expect to enjoy the use of your cell phones, houses, whatever. It is why you can reasonably expect not to be harassed by government in any country that actually aspires to the fundamental concepts that I have been discussing. It is why life is orderly for the most part rather than random. And this is why relevance and materiality

³ See n. 1, *supra*.

are so fundamentally important to the construction of a liberal legal system. (e.g. FRE 401, 402, 403) They tie the legal system to the bedrock of factual accuracy, and generate the consequences identified above.

Rights and obligations depend on facts, and can only be implemented systematically with knowledge of the actual, relevant states of affairs. How legal systems reconstruct the facts, what is the most accurate and/or efficient methodology, and critically what policies may offset the significance of factual accuracy, are matters of reasonable disagreement. Thus, to understand the problems posed by expert evidence in any legal tradition, one needs to address the basic conception of a trial and the way in which knowledge is constructed in that conception. I will thus next describe the system of trials that I know best, the Anglo-American approach. Let me hasten to add that, although there are aspects of the Anglo-American approach which are idiosyncratic, the significance of knowledge for rights is universal. I will explore that problem in detail within the context of the Anglo-American tradition, but the lessons of that exploration generalize, as I will briefly discuss at the end of this paper.

Rather obviously, trials in the Anglo-American tradition were originally the means to resolve social disputes. These disputes were conventional and not highly complicated because society itself was not highly complicated. Indeed, the original mode of trial, from which trial by jury emerged, gathered together individuals with knowledge of local affairs to decide disputes based on their pre-existing knowledge – the exact opposite of the conventional, although, mistaken belief that modern juries must be completely ignorant of anything connected to the litigation. Ongoing disputes were part of community knowledge. More importantly, so was the knowledge of the facts necessary to resolve them. Many disputes, for example, involved truly local conventions, such as rights of way or easements, which meant they were known throughout the relevant community. Similarly, knowledge of who did what to whom was likewise notorious and, along with knowledge of local conventions, formed the basis of dispute resolution.

Even at a relatively early stage of development, situations would arise that did not involve notorious knowledge, and

witnesses began to be heard, but this was more the exception than the rule. As society, and in particular the economy, evolved, matters became more complex and knowledge began to be more stratified. As commerce developed, cases could turn on the practices of professions, for example, which require evidence of those conventions. Foreign languages may need translation, or the case may involve a technical vocabulary that, like a foreign vocabulary, must be made accessible to those lacking the pertinent knowledge. Interestingly and under the influence of the growing political importance of the jury, as such cases became more common the Anglo-American legal system continued to adhere to the traditional model of fact finding. The parties were merely obligated to explain a little bit more, to put the fact finder in a position to understand what the witnesses were saying, and thus to decide the case in an intelligent fashion.

The Anglo-American system strove to maintain its conception of the ideal trial, in other words. The facts were to be found by the disinterested application of common sense by members of the community. With the introduction of witnesses, were it possible, the fact finders would have access to the background and experience of each witness so that the fact finder would know precisely why a witness testified as he or she did. After determining the most plausible account of what actually happened, (*Cf. Allen, The Nature*) liability would be determined consistent with the law.

It is not possible to merge the minds of witness and fact finder, and so the common law systems developed methods to approximate that result. This is the source of the opinion rule that requires that witnesses restrict testimony to their observations and not the inferences (opinions) witnesses may draw. The distinction between "fact" and "opinion" is analytically insupportable, (*Cf. Allen, Kuhns, Swift, Schwartz*) but as a heuristic it pressures witnesses to relate as much as possible their sensory impressions, leaving the fact finder to decide the facts, as though the fact finder had actually observed them rather than just heard about them. This also explains the rise of liberal rules of cross-examination that allow witnesses to be probed concerning the basis of their testimony.

In many respects, these rules accomplish their purposes, although with certain costs, of course. Typically, everyone at trial – judges, jurors, witnesses – have shared enough backgrounds so that effective communication, and more importantly comprehension, is possible. The probability of these increases with the size of the body deciding a case, because each person added to the group brings a lifetime of experience and knowledge by which to judge the evidence. Small groups of people are enormously powerful and accurate processors of information, although again there are costs attached to any form of decision making.

Some may be wondering how accurate this description is today, especially in the United State where a fairly robust use of jurors continues and the conventional media are filled with stories about how difficult it is in some cases to find jurors who are ignorant of a case to be tried – a difficulty that compounds dramatically with notorious or scandalous cases. The short answer is that the conventional view that potential jurors must be ignorant of the case is false. The more interesting answer is that it must be false and thus fact finders are still extensively self-informing.

The conventional belief that fact finders must come with a blank slate is false in every respect save one. The belief is false in the technical sense that knowledge about the litigated event is typically not a disqualification; only knowledge that would qualify a person as a witness disqualifies the person as a juror.⁴ The conventional belief about the necessary ignorance of jurors is false in a deeper and more important sense, and one that is essential to understanding the true conceptual challenge of expert testimony, to which I will soon turn. Here is the necessary preliminary conceptual point: Fact finders come to trial with a vast storehouse of knowledge, beliefs, and modes of reasoning that are necessary to permit communication to occur simply and efficiently. So long as everyone is qualified in English, words are not defined except in exceptional cases. Conventional beliefs about the nature of reality and the existence of causal relationships are just assumed to be held by all participants, and virtually never are the subject of evidence. Everyone is just assumed to engage in orderly reasoning, employing all the necessary forms

⁴ This is implied by *Federal Rules of Evidence* 606's prohibition on jurors being witnesses.

—deductive, inductive, abductive, and statistical— as necessary or appropriate. Given a common language, or translations if necessary, comprehension of witnesses is just assumed, as is the ability to perceive the connection between the evidence and the trial. Everyone is assumed to know about the foibles of human testimony and the perverse effects of potential biases, and thus to be able to judge the credibility of the testimony. Less well known, everyone is expected to be able to fill in the evidentiary gaps at trial that result from many factors (including that individual witnesses always know more than they can express) by drawing inferences based on one's own experience.

In fact, the very concept of “evidence” cannot be understood as simply the testimony and exhibits produced at trial, and instead must involve an interaction between a human being and their observations, which presses the self-informing nature of the trial to an even deeper level. I once summarized this point in the following way:

Suppose a witness begins testifying, and thus a fact finder must decide what to make of the testimony. What are some of the relevant variables? First, there are all the normal credibility issues, but consider how complicated they are. Demeanor is not just demeanor; it is instead a complex set of variables. Is the witness sweating or twitching, and if so is it through innocent nerves, the pressure of prevarication, a medical problem, or simply a distasteful habit picked up during a regrettable childhood? Does body language suggest truthfulness or evasion; is slouching evidence of lying or comfort in telling a straightforward story? Does the witness look the examiner straight in the eye, and if so is it evidence of commendable character or the confidence of an accomplished snake oil salesman? Does the voice inflection suggest the rectitude of the righteous or is it strained, and does a strained voice indicate fabrication or concern over the outcome of the case? And so on.

The list of relevant variables goes far beyond credibility issues, of which demeanor is only one. When a witness articulates a proposition, the fact finder must determine what the proposition is designed to assert and what the fact finder believes it asserts. That task, too, involves an immense number of variables. In addition, the fact finder

will possess some knowledge based on its observations leading up to the first articulated proposition by a witness, acquired from the lawyers for example. And there are many more examples. For the law to proceed [in a rule-based fashion] would require that many of these variables be in a deductive structure with their necessary and sufficient conditions spelled out. No such structure could be created; it would be too complex. (Allen, *Factual Ambiguity*)⁵

The different strands of what I have described so far can be pulled together into a coherent whole that describes the deepest aspirations of any liberal legal system, and that is to vest decision in competent, disinterested individuals able to process and deliberate upon the evidence to reach a rational judgment as to what occurred – and thus as to the rights and obligations of the parties.

Expert testimony as a reproach to the aspirations of trials

Fine, one might now think with a hint of exasperation, but what if testimony can only be understood with knowledge or experience that the fact finder lacks so that the chances are virtually zero that the fact finder will understand what the spoken words are intended to convey, or at least will be unable to intelligently appraise the truth of what is spoken? That is the problem posed by expert testimony, and there are only two possible solutions to it. Either the necessary background information must be provided somehow, or fact finders must defer to the judgment of others. Here “to defer” means to adopt someone else’s views as correct, not because you understand and agree, but because you are simply delegating that decision to someone else. Virtually always, the Anglo-American legal system has chosen to require that information be provided in a comprehensible fashion to the fact finder. If a witness speaks a foreign language, translations will be provided. When routine business practices or conventions matter, for example, evidence is adduced on the topic so that the fact finder may judge what the actual routine practices or conventions are. Requiring that the trial

⁵ Douglas Walton has articulated a similar analysis of legal evidence. The complexity of real life is the central problem that AI and the law researchers face. (Cf. Walton). See Allen (“*Artificial Intelligence*”). For an early philosophical discussion to the effect that people can disagree about the implications of evidence Cf. Polya.

evidence be connected to the background and experience of typical members of the community approximates the ideal vision of a trial. The central conceptual problem of expert testimony is that its use at trial is often inconsistent with the normal conception of a trial. Experts often engage in years of specialized training, which can make it difficult to educate the fact finder about the relevant issues at trial. Although the controversies over expert testimony explicitly are typically about such things as reliability, they in fact are controversies over supplanting the norm of education by deference when someone qualified as an expert speaks, and thus can only be resolved by addressing that issue.⁶

The obvious first question to ask is whether deference is ever an absolute necessity, whether there any cases that cannot be accommodated within the traditional model. Do some cases present issues for decision that defy the ability of fact finders to understand them? Perhaps the answer to these questions is “no.” The deficits of juridical fact finders do not appear to be cognitive; they are informational. Judges and jurors lack knowledge about many things, like science and technology, but there is no reason that they could not adequately master the relevant fields. This does not mean that a fact finder would have to become an oncologist or radiologist, or whatever. The objective is not to understand any particular field in its entirety. Rather, the objective is to learn enough so that rational deliberation can occur. In this respect, multi-body decision makers – either juries or panels of judges – are actually superior to single person decision makers. Not every member of a panel needs to understand deeply every issue. The question is whether the panel adequately understands. It would be astonishing if a legal case actually defied the cognitive capacities of a small group even randomly picked from society at large, let alone vetted as both judges and jurors are.

Obviously, there are examples of ideas and even fields of inquiry that may defy common understanding at present. Many ideas in physics seep only slowly into the general population, even the general population of scientists. Maybe it would be asking too much for a judicial fact finder to learn special relativity or quantum theory, but to my knowledge these theories are not

⁶ The education-deference distinction was first introduced into the literature by Allen & Miller (*The Common*), and Allen (*Expertise and*). This article is an extension of those articles.

pertinent to any litigation that has ever occurred. Admittedly, physics is not the only difficult science to learn. Many individuals find higher mathematics difficult (which is probably why they find physics difficult). Examples of two areas of somewhat higher mathematics that are pertinent to modern trials are calculus and probability theory. Still, while some people do, others do not find mathematics at this level obscure – or more importantly would not find it impossible to learn sufficiently for intelligent decision. Here again is the value of a multi-body decision maker. As I said above, what matters is not whether everyone understands but whether the body as a whole does or could learn what is needed for intelligent decision.

The real objection to educating the fact finder is not that it is impossible but that it would be too costly. If statistics plays a role in the trial, it would have to be explained so that the fact finder can understand which would require some considerable instruction. The same would be true of various areas of medicine, and so on. In some cases, this educational process would not be terribly burdensome, but in others it would be difficult and require extensive instruction. So, yes, it would be costly, but I literally do not know of any cases actually litigated that would seem to defy this educational process.

The question then becomes whether the increased cost of educating the fact finder about the basis of “expert” testimony is a reason to forego the normal ideal of a trial and substitute a form of deference. The very question highlights in an important sense one of the bizarre aspects of the conventional discourse over expert testimony. There are many cases without scientific or technical questions that nonetheless involve months of testimony. No legal system in the west of which I am aware defers to experts in such cases; the parties are required to prove the case with evidence that is comprehensible to the fact finder. It is difficult to understand why a deferential procedure should be followed merely because a party produces something labeled “expert testimony.” The cognitive questions are essentially identical in both sets of cases, and the economic issues are truly identical. In all cases and for all witnesses, the parties in fashioning strategy account for the costs of presenting witnesses and responding to the other side. There is nothing unique about expert witnesses in that regard. An

objection on the ground that the public subsidy to trials should not be wasted by requiring more detailed examination of the basis of expert testimony highlights the bizarre nature of the controversy. The public subsidy to a year long trial involving radiology is not substantively different from the subsidy to a yearlong securities trial. Indeed, if there is a difference, it favors the subsidy for radiology, as the fact finder might actually benefit from learning about radiology, as compared to the utter uselessness of the evidence that fact finders have to process about the unique and idiosyncratic facts of various disputes. The objection on the ground of cost to educating the fact finder has it exactly backwards.

The solution

If the central aspiration of trials is to be achieved, the parties must educate the fact finder in all instances. This would eliminate the legal problem of “expert” testimony, because the category would no longer exist. That may seem like solving a problem by definitional fiat, but it is not; the point cuts much more deeply than that. The lamentable consequence of conducting trials through deference is that mistakes will be made because fact finders choose to defer to a purported expert who is in fact not testifying on the basis of knowledge but instead is providing what is called in the United States “junk science.” Junk science and unreliable expertise exploit the informational vulnerability of the law, the necessary condition of which is the fact finder not understanding the basis of the expert’s testimony. Making all witnesses, including what are now called expert witnesses explain their testimony will largely eliminate this problem because false propositions resist comprehensible explanations. I do not say make them impossible, but the presentation of unreliable evidence would be made considerably more difficult.

But I need to examine the other side of this epistemological coin. Perhaps I am wrong that the primary limitation of fact finders is informational rather than cognitive; perhaps there are cases that involve “knowledge” in a strict sense – true justified belief – that judges and jurors are not able to comprehend. I do not doubt that some people do possess specialized nonconventional knowledge pertinent to legal disputes about many fields such as mathematics

and medicine. If such knowledge exists and cannot be conveyed at trial, then it is pointless to hold trials involving it in any legal tradition that emphasizes decision by disinterested individuals who rationally process the evidence; that simply cannot occur with a deferential mode of presenting evidence. Quite the contrary, if there are forms of expertise that are pertinent to trials but cannot be explained at trial, the solution is to not try those cases. If expertise exists and can be identified with the certainty that we know that we are presently in Columbia, its lessons should be embraced and the case so decided. How to do so is a different question. The form of trial but not its substance can be preserved through procedures like judicial notice or peremptory motions (summary judgment, directed verdict); alternatively, disputes can be resolved definitely by the state through legislation or regulation.

By contrast, maintaining the present form of trial that involves expertise that is not comprehensible to the fact finder is, literally, nonsensical. In trials, both sides offer expert opinions to which fact finders can defer; these opinions are virtually always diametrically opposed, with one favoring one party and the other favoring the other. If there are not opposing opinions, there is not a triable dispute, and the side with the unassailable (or at least unassailed) expert wins. If there are competing experts, fact finders in a deferential process do not grapple with the facts but simply decide which expert's opinion to accept. And now the critical question: How can fact finders defer intelligently without understanding the relevant fields? Essentially the only way that one could know which expert to believe is by knowing the field adequately enough to appraise the opinion in light of the facts of the particular case. Without knowledge of the field of inquiry, the fact finder has no rational basis to defer to either expert. This point reverberates over the use of expertise at trial, and emphasizes how much the present form of expert testimony is a reproach to the deepest aspirations of the Anglo-American legal system. Deference simply cannot be reconciled with those aspirations. To restate the obvious, fact finders (or anyone else) who do not know enough to draw the correct inferences from the evidence cannot decide intelligently which expert opinion to choose as correct. If, by contrast fact finders can decide intelligently about which expert to believe, deference to the expert is not necessary. The fact finders could see for themselves the progression of the expert's thought leading

from the specialized knowledge through the evidence of the case to the conclusion being offered.

The reduction in the likelihood of rationality is at odds with the essence of the common law mode of trial (and all other trials in the liberal tradition), which as I have said a number of times is the pursuit of factual accuracy through rational deliberation. Indeed, there is a high irony here. The mere admission by the trial judge of competing expert opinions without requiring an explanation of the experts' views, including testimony on the underlying field of inquiry, ensures that decision will be a rational if not irrational. Only if a fact finder could see clearly that one side was right and the other wrong would decision be rational; but if that were so, the judge would admit only the one version and exclude the other. If reasonable people could rationally disagree about which expert is right, they would be able to understand the underlying dispute, and thus deference would not be needed. Note also the dramatic qualification of the normal rules of relevancy that deference entails. Normally a party must explain the relevance of evidence by adequately connecting the evidence to the fact finder's understanding, but that is simply not possible without an understanding of the basis of any expert testimony.

An important qualification to explain one possible objection: deference and education are not analytically distinct but opposite points on a spectrum. Raw data is almost never presented at trial (once in a while a demonstration will occur in court, but such things are rare). There is an element of deference in deciding that a witness has testified truthfully. Even if deference and education are ubiquitous variables, they can be present in differing concentrations. Compare hearing the evidence of sensory experience ("The defendant hit the plaintiff.") to the drawing of inferences ("In light of these studies, I am of the opinion that smoking causes cancer."). The key variable is whether the fact finder understands the reasoning process that led the witness from observation to conclusion. Without that understanding, appraising rationally the evidence is literally impossible. Often with experts there is no expectation that the reasoning process can be understood. Thus, acceptance or rejection of an opinion cannot occur by the exercise of judgment, and in precisely that way deferring to an expert differs from the deference involved in deciding whether to believe a lay witness.

In sum, there are only two ways expert evidence can be dealt with because there are only two ways evidence can be dealt with. The first is to treat expert testimony just like any other testimony, which means for it to be admissible it must be understandable by the fact finder. To make an expert's testimony understandable will require the fact finder to be educated about the relevant matters. The difficulty is cost, and especially that cost may skew decision toward those with greater resources. The more impecunious a party, the less able he or she will be to provide the necessary educative function, or to respond to an opponent's case. The latter point is an aspect of the U.S. system's failure to make parties bear the true cost of their cases, which includes the opponent's cost of responding. Without cost shifting, a wealthier party can make the cost of suit too high for the opponent. Adopting the normal approach to expert testimony would exacerbate this problem by tending to make cases involving expertise more protracted.⁷ It would, however, maintain decision by disinterested individuals who have processed and deliberated upon the evidence.

The alternative to education is deference: Fact finders can either be asked to choose which expert to believe even though the fact finder is incompetent to do so rationally, or the state can definitely determine an outcome. The only possible advantage of a deferential model at trial is the potential reduction of cost, but those savings are secured by increased irrationality in decision. Removing issues from fact finders through definitive state resolution has the potential to vest responsibility in those with the ability to decide rationally and consistency in decision is advanced. If the decisions about expertise are correct, accuracy in decision should be advanced as well. There are two disadvantages to this approach. First, it amounts to imposing an official orthodoxy on truth. More troublesome still, what guarantees does one have that the official answer – the official dogma, as it were – is correct? One of the advantages of litigation is that it permits a constant evaluation and reevaluation of the truth of various beliefs that are at certain moments in time taken for granted. If there is an official orthodoxy and that orthodoxy is incorrect, consistency of

⁷ Although the matter is too complicated to pursue now, offsetting this factor in part is that higher costs are a laudable disincentive to sue or an equally laudable incentive to agree to resolution in other, less costly, forums. How to balance these matters is one of the largest challenges of modern legal systems.

decision will remain, but the decisions will be consistently wrong. Of course, this advantage of litigation requires an educational, not a deferential, mode of trials.

Some may think that what I have been describing is not really a problem. The great emphasis on the adversary system and the privatization of social disputes in the United States let parties choose whether to educate the fact finders or convince them to defer to an expert. This leaves the whole matter up to the parties, save only for the admissibility decision of judges. The parties know their dispute and their resources better than anyone else, and are in the best position to make choices that optimize their interests. There is one last critical point, though. A deference model exacerbates the problem of cost by introducing functional cost-shifting. If the trial judge admits one party's expert testimony, and that party simply presents the expert's conclusions or opinions, the actual cost of explaining those opinions can be shifted to the other side. This raises the opponent's transaction costs, and facilitates strategic game playing by undermining the normal rule that parties bear their own costs.⁸

I have tried to demonstrate that the use of expert testimony poses fundamental challenges to any system of adjudication, which explains in part the growing controversy over expert testimony even as expert testimony is becoming ever more prevalent at trial. Lurking here is the question embarrassing to much current practice involving experts: To what extent is rational deliberation the hallmark of adjudication? To what extent are fact finders supposed to listen to, process, deliberate upon the evidence, and decide legal rights and obligations consistently with true determinations of facts? Any system dedicated to rights and obligations implicitly if not explicitly adopts just such a juridical model. Indeed, that is precisely why I began this article as I did, with an emphasis on how fundamentally important factual accuracy is to any system dedicated to the rule of law. In part, the controversy over expert testimony is fueled by failing to treat the underlying cause of all the difficulties, which is the incompatibility of the deferential mode of treating expert testimony with the fundamental aspirations of trials. I will develop that point below, but first to get a sense of just

⁸ A rule as I noted above that is sometimes honored in the breach. The present use of expert testimony pokes a potentially enormous hole in the normal practice.

how big a problem the unreflective reliance on dogmatic assertions of knowledge can be, consider some of the categories of evidence that have been routinely admitted at trial in the United States, only subsequently to be shown to be anywhere from questionable to highly unreliable:

- Shaken baby syndrome – are there effective markers sorting out innocent Sudden Infant Death Syndrome from abusive behavior?
- Hand writing analysis – is there truly an expertise here? And are experts even consistent in their judgments about hand writing?
- Finger prints analysis – uniqueness has never been subjected to empirical testing, nor have experts been validated for accuracy.
- Predictions of dangerousness – unreliable and unvalidated psychiatric testimony has sent people to jail for extensive periods of time.
- Repressed memories – again unreliable and unvalidated psychiatric testimony has sent people to jail for extensive periods of time.
- Hair and fiber analysis has been shown to be unreliable.
- Identification of causation of diseases – often unreliable.
- Silicone’s deleterious effect on the autoimmune system – completely false.
- Arson investigation used completely discredited methodologies.
- For decades, the scientific evidence showing smoking causes cancer was suppressed.

The experience in the United States suggests that something is seriously amiss in its treatment of expert testimony.⁹ I believe and will attempt to demonstrate that the major problem is that the U.S. law has neglected the central conceptual problem posed by expert testimony. Rather than directly dealing with the deferential aspects of expert testimony, the law in the United States has tried to tinker with deference to improve it. The impulse lying behind the tinkering is understandable. Much specialized knowledge is undoubtedly useful in resolving disputes, but even if it is not

⁹ For a systematic discussion of the problems with forensic sciences and the law, see the report of The National Academy of Sciences, National Research Council, and Strengthening Forensic Science in the United States: A Path Forward (2009).

impenetrable it is often challenging and difficult. If we could just get deference right, we could cheaply and efficiently import that knowledge into trials and improve the accuracy of verdicts.

As the above examples indicate, however, tinkering with deference has not been terribly successful. Some may think this is because of the incompatibility between “scientific” knowledge and lay knowledge, but that is not the cause of the difficulties. Incompatibilities between forms of knowledge do not exist; there simply is or isn’t knowledge. To be sure, knowledge in many organized fields of inquiry is probabilistic, but this is true of general and specialized forms. Much of “scientific” knowledge is highly complicated, but so, too, is ordinary life — indeed, ordinary life is more complicated than any specialized body of knowledge. Science proceeds by simplifying and studying what is amenable to study. (Allen, *Factual Ambiguity*) The biggest difference between scientific inquiry and litigation is that the legal system cannot delay decision while it waits for knowledge to advance — maintaining the status quo is a decision on the merits for someone — but this has literally no programmatic implications for the use of expert evidence at trial.

In my opinion, the struggle of the American legal system to domesticate expert testimony is largely if not entirely due to its neglect of the incompatibility of deference and education at trial rather than the incompatibility of scientific and some other form of knowledge. This, though, is a lesson that I suspect generalizes to many other legal systems. I will thus end this article with a brief description of the unsuccessful efforts to accommodate expert testimony in the United States.

As is well known, the systematic treatment of scientific evidence in the United States began with *Frye v. United States*. (293 F. 1013 (D.C. Cir. 1923)) The defendant, Frye, sought to introduce into evidence the results of an early type of lie detection device — a systolic blood pressure test. In upholding the trial court’s exclusion of the evidence the Court of Appeals adopted a special rule for the admissibility of scientific evidence, stating:

Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone

the evidential force of the principle must be recognized, and while courts will go a long way in admitting expert testimony deduced from well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs. (*Frye v. United States* 1014)

The *Frye* opinion is unclear about precisely what “the thing” is that must have gained “general acceptance.” Is it the relationship between truth-telling and blood pressure, or the ability of an expert to measure and interpret the changes in blood pressure, or both? Still, the opinion eventually proved very influential, and a majority of courts in the United States adopted the “general acceptance” or “*Frye*” test.

The attraction of the *Frye* test is immediately apparent from the perspective of the conceptual framework I have developed above. We are confident that there are organized bodies of knowledge that transcend everyday knowledge, and we know further that the judicial process needs access to that knowledge to decide cases correctly. Yet, by hypothesis, the juridical fact finders do not have ready access to that knowledge. I refer to this as the informational vulnerability of the law — we know we need knowledge that we do not know the substance of, and thus we are vulnerable to those who claim to possess such knowledge. In those circumstances, it is perfectly sensible to identify accepted bodies of knowledge and then defer to those who in fact do possess that knowledge — if you can to it. That is precisely what the *Frye* test, with its emphasis on “general acceptance,” does. It tries to identify uncontroversial expert knowledge and sets up those experts in that knowledge as the arbiters of the relevant facts. The problem is again the law’s vulnerability — it doesn’t know what it doesn’t know and can only take someone else’s word for it. Those offering assistance, however, have their own agendas which go beyond a disinterested pursuit of the truth. This is why the test failed in its overall objectives, which in turn led to considerable dissatisfaction with it.

The United States Supreme Court rejected *Frye* in *Daubert v. Merrell Dow Pharmaceuticals, Inc.* (509 U.S. 579 (1993)), and under

its influence *Frye* test has been rejected in many jurisdictions.¹⁰ The most fundamental problem with the test was the painfully obvious point in retrospect that, if purported experts with impressive credentials can be recruited to testify to just about anything, deference fails utterly. The test was also the subject of extensive internal criticism that it was not responsive to modern scientific developments. It was biased against emerging disciplines or cross-disciplinary studies and in one sense had too stringent of a requirement of general unanimity within complex fields. The test was rendered anachronistic by the astonishing increase in and the splintering of disciplines into subspecialties. Courts also struggled to apply it to specialized but nonscientific disciplines.

The Supreme Court, quite appropriately, concluded that a formal standard was inappropriate and that instead the trial courts had to engage substantively with proffered testimony to ensure that only relevant and reliable evidence is admitted at trial. In the now famous phrase, the trials courts are to act as “gatekeepers” to ensure the epistemological soundness of trials.

Although the central message of the case is clear and goes decidedly in the right direction of requiring the trial courts to engage substantively with fields of expertise, the *Daubert* opinion nonetheless demonstrates the remarkable shadow that the urge to defer to acknowledged expertise casts in the American system. This is most clear in the Court’s amateuristic effort to articulate the criteria of “scientific knowledge,” virtually all of which reflected backwards on *Frye*’s general acceptance standard. The Court identified four factors relevant to the determination of the admissibility of expert testimony, three of which derive directly from *Frye*:

--Has the subject matter been subjected to falsifying tests? Falsifying experiments take place within normal generally accepted scientific canons.

--Has “the theory or technique has been subjected to peer review and publication.” Rarely do results not within generally accepted paradigms get published.

¹⁰ All but a handful have embraced *Daubert* (*Cf. Mueller & Kirkpatrick* 639). It is important to bear in mind that each state within the United States provides its own law of evidence. The Supreme Court of the United States only decides evidentiary questions for the federal courts.

--In determining whether data is sufficiently reliable to be admitted, a court may also look to general acceptance. This adopts general acceptance explicitly.

The fourth criterion identified by the Court is merely that rate of error in scientific techniques should be taken into account. Of course, failing to take into account error rates would seriously undermine any work purporting to be scientific.

What is most startling about this list is that, in the context of a rejection of formal standards for the admission of scientific evidence, the Court retreated to a set of formal standards. This reflects the informational vulnerability I referred to earlier. It is one thing to say that the trial courts should engage with the underlying science; it is another to do it, and it will not be easy. In any truly specialized field, there are reasons why it takes long study and effort to become an expert. The Court's list implicitly acknowledged the difficulty of what it was asking the lower courts to do, and offered suggestions as to how to simplify the effort.

Interestingly, the lower federal courts saw in *Daubert* the invitation to be much more careful in admitting expert testimony, and they accepted the invitation with some enthusiasm. As a result, *Daubert* has significantly changed expert testimony in federal litigation. The Supreme Court has encouraged this process by recognizing that the *Daubert* factors are suggestions not mandates, and also made clear that *Daubert* applies to all forms of specialized evidence; the trial courts must guard against the admission of unreliable evidence, regardless of the nature of the expertise.¹¹ How the trial courts are to do that depends upon the nature of the subject matter; the Court, in short, has rejected a deferential mode of proceeding so far as the admissibility decision is concerned, and now insists that trial courts must be educated enough about the relevant subject matter so that the court can independently conclude that the expert's testimony is actually based upon knowledge. This is unmistakably a very positive development, to

¹¹ Later decisions made it clear these were only suggestions, *Kuhmo Tire Co. v. Carmichael*, 526 US 127 (1999), and that the responsibility for implementing the reliability test lay primarily in the lower courts, *General Electric Co. v. Joiner*, 522 U.S. 136 (1997).

the extent one cares about the central aspiration of trials to reach factually accurate results.¹²

But there is one glaring and remarkable problem in what the Court has done, and thus in the use of expert testimony in federal court. Remember that juries are still used frequently. The *Daubert* line of decisions most emphatically does not require that the trial judge insist that the experts educate the jury as well as the judge. Many experts still testify to their conclusions without truly educating the jury, a process that is actually encouraged by the Federal Rules of Evidence. (e.g. FRE 703, 703, 705) That leaves the jury exactly where it was before, with, incomprehensible opinions and the irrational mandate to choose one or the other. This is the great mistake of the United States' approach to expert testimony. *Daubert* started well but ended badly. The Court saw the epistemological abyss, bridged it in part, but stopped short of a requirement that evidence can only be admitted if it was capable of being understood. If testimony is not explained in sufficient detail to allow the fact finder to understand it, trial verdicts cannot be rational.

Returning one last time to my main theme, I suspect many of the legal systems represented at this conference engage in a considerable amount of deference to experts. Indeed, many systems may be going through precisely the turmoil that the American system has gone (and still is going) through. England and Wales plainly are,¹³ as are various Northern European countries. (Jackson & Summers 74-6) I know very little about the Southern European legal systems and those of Central and South America, but I predict that a similar dynamic is unfolding there with those judicial systems, to recur to my previous phrase, tinkering with deferential modes of proceeding. I would caution against this. What someone else says is true should not be accepted without a demonstration that they are, or at least probably are, speaking on a secure foundation of reliable knowledge. As the examples I gave earlier show, much purported expertise turns out to be false. In addition, unfortunately scientific and intellectual

¹² The experience in the federal courts may differ from that in state courts. Some observers think that the change from *Frye* to *Daubert* within various states did not make much of a difference in practice. See in particular Cheng and Yoon (2005).

¹³ For an examination of the English experience and an analysis of the recent Law Reform Commission report on Expert Evidence in Criminal Proceedings in England and Wales, that sounds almost like a rerun of the experience in the United States (Cf. Edmond).

disciplines have their own agendas which can lead to misleading and biased presentations, and some of their practitioners have the incentive not to disclose the limits of their disciplinary knowledge. Unless challenged, experts may tend to make stronger statements than the actual state of the discipline allows. All of these limits on the reliability of expert testimony can result in irrational and erroneous outcomes at trial. To the extent one subscribes to what I have described as the central aspiration of trials to reach factually accurate results, the single most important task is to insist that trials be truly educative and not deferential.

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Como citar:

Allen, Ronald J. "The Conceptual Challenge of Expert Evidence". *Discusiones Filosóficas*. Jul.-dic. 2013: 41-65.