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FIRE SCIENCE ON TRIAL: THE WILLINGHAM EXECUTION

By Richard Schulte

On December 23, 1991, a fire occurred in the home of Cameron Todd and Stacey Willingham in Corsicana, Texas. All three of the Willingham's three children, age 2 and twins age 1, perished in the fire. The fire was determined to be arson and the father of the children was charged with the crime, convicted and sentenced to be executed. On February 17, 2004, the State of Texas carried out the sentence.

Prior to carrying out the execution, an expert reviewed the evidence in the case and determined that the fire may have been accidental, rather than arson. The governor of the State of Texas chose not to intervene in the justice system and Willingham was executed. After the execution, questions remained as to whether or not the fire was actually arson.

Given the questions surrounding the conviction of Willingham, the Texas Forensic Science Commission retained the services of another expert to review the evidence in the Willingham case and another case. This expert, Dr. Craig Beyler, Hughes Associates, Inc., developed a report dated August 17, 2009 titled "[*Analysis of the Fire Investigation Methods and Procedures Used in the Criminal Arson Cases Against Ernest Ray Willis and Cameron Todd Willingham*](#)".

The following are excerpts from Dr. Beyler's report. (These excerpts are limited to Dr. Beyler's general comments regarding these two fires and Beyler's comments on the fire at the Willingham home.)

"This report evaluates the fire investigation methods and procedures employed by fire investigators in the criminal arson cases against Ernest Ray Willis and Cameron Todd Willingham. The goal of the report is to evaluate the fire investigations as documented by the fire investigators in the form of reports and their trial testimony. The objective is to assess the methods and procedures with respect to the contemporaneous fire investigation standard of care and the contemporaneous knowledge in fire safety science. In addition, this report assesses the methods and procedures with respect to the current fire investigation standard of care and the current state of knowledge in fire safety science."

“ . . .the Willingham fire occurred in Corsicana, Texas on December 23, 1991. . .on February 17, 2004 Cameron Todd Willingham was executed by lethal injection.”

“The current standard of care in fire investigation is expressed by NFPA 921, Guide for Fire and Explosion Investigations, published by the National Fire Protection Association (NFPA). Work on this document was begun in the mid 1980's, but formal publication did not occur until 1992. . .”

“The core of the 921 methodology is the application of the scientific method to fire investigation. In the context of fire investigation this involves the collection of data, the formulation of hypotheses from the data, and the testing of the hypotheses. Conclusions can only be drawn when only a single hypothesis survives the testing process. None of the investigators employed this methodology. Indeed, in no case was any methodology identified. . .Of course this provides no basis for finding reproducible and defensible conclusions, an absolute requirement for rational use of fire investigation in the criminal justice system.”

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“During the 1980's, fire investigation was in the early stages of maturation and change. The literature reflects some use of and impact of fire science, though the tradition of fire investigation as an art based solely upon personal experience and the associated folklore was certainly still in place. . .”

“While fire science was beginning to have an influence, it must be said that the tradition of fire investigation as an art based upon experience and folklore remained dominant. . .As such, there was no rigor in the means of reaching conclusions from the data and its interpretation. . .”

“Many myths have grown up that have no scientific basis.”

“The overall methodology in arson cases, as practiced in the 1980's, is the process of elimination. . .”

“Many myths have grown up that have no scientific basis.”

“The Willingham fire occurred on December 23, 1991 at 10:34 am.”

“Manuel Vasquez, of the State Fire Marshall’s Office, conducted his scene investigation on 30 December 1991 and 2 January 1992, about a week after the fire.”

“FM Vasquez determined that there were multiple origins based upon his scene examination and from statements of eyewitnesses. The role of eyewitness observations was not provided. FM Vasquez satisfied himself that he had eliminated electrical and natural gas causes. He determined that the fire was incendiary and the fire traveled from the children’s bedroom into the hall and out onto the porch. FM Vasquez found Willingham’s statements of his actions the morning of the fire to be pure fabrication, saying “A fire does not lie.” In essence he is indicating his confidence in his interpretation of the physical evidence over the statement of Mr. Willingham.”

“In excess of 50 interviews were conducted in the course of the investigation.”

“Corsicana Fire Department Assistant Chief Douglas Fogg prepared an eight page report of the investigation. As a first responder he provided a narrative of the fire department operations.”

“Electrical wiring in the room showed no shorting but no appliances were noted.”

“FM Vasquez arrived on 27 December and additional unspecified samples were taken. The fire was taken to be arson at this time. . . On January 2-6 a class 3 petroleum distillate was found in unidentified samples.”

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“Defense counsel posited a scenario of child firesetting using lamp oil and FM Vasquez agreed that based upon the available evidence, this scenario could not be ruled out.”

“Chief Fogg acknowledged that a child could have started the fire with a lighter or match and that his evidence could not eliminate this hypothesis. . . He was unable to say that the child starting the fire was impossible, but rather that he simply regarded the possibility as remote.”

“Fire Marshal Vasquez is unique among the investigators of both fires in his attitudes toward arson and fire scene examination. His statistics of the fraction of fires which are in fact arson are remarkable and far exceed any rational estimate. It reflects his predisposition to find arson in his cases. This directly violates NFPA 921 and professional norms in general. His quotation that “The fire tells a story, I am just the interpreter,” and “the fire does not lie, it tells me the truth,” are hardly consistent with a scientific mindset and is more characteristic of mystics or psychics. The quotes separate the findings from his own judgment and seek to make him not responsible for his own interpretation. It seems to deny the role of rational reasoning. It is an expression of fire investigation as a mystical art rather than an application of science and reason.”

“Returning to his mysticism he states, “The fire, itself, tells me that it’s a very aggressive fire; and, therefore, the fire was not a planned fire. It was a spur-of-the-moment fire.” Such statements are beyond belief in the context of fire investigation as an applied science.”

“His [Vasquez] ideas about fire are often inconsistent with modern fire science.”

“Understanding how burn injuries could occur is an important part of fire investigation and FM Vasquez seems to be wholly without any realistic understanding of fires and how fire injuries are created.”

“In the end FM Vasquez concludes that the fire was arson based solely on the physical evidence at the fire scene. Remarkably, he gleans human intent from the physical evidence. Apparently, the fire communicates with FM Vasquez about people as well. FM Vasquez’s opinions are nothing more than a collection of personal beliefs that have nothing to do with science-based fire investigation.”

“The investigation of the Willis and Willingham fires did not comport with either the modern standard of care expressed by NFPA 921, or the standard of care expressed by fire investigation texts and papers in the period 1980-1992. The investigators had poor understandings of fire science and failed to acknowledge or apply the contemporaneous understanding of the limitations of fire indicators. A finding of arson could not be sustained based upon the standard of care expressed by NFPA 921, or the standard of care expressed by fire investigation texts and papers in the period 1980-1992.”

“Returning to his mysticism he states, “The fire, itself, tells me that it’s a very aggressive fire; and, therefore, the fire was not a planned fire. It was a spur-of-the-moment fire.” Such statements are beyond belief in the context of fire investigation as an applied science.”

The Texas Forensic Science Commission provided the Corsicana Fire Department with a copy of Dr. Beyler's report and requested that the Fire Department review and respond to the report. The following are excerpts from a letter responding to the Forensic Science Commission request dated September 29, 2009 and signed by the Fire Chief, Chief Donald McMullan. The following are excerpts from Chief McMullan's letter:

"Dr. Beyler continually uses the phrase "standard of care." NFPA 921 speaks in terms of Recommended Practice and Standards. As I understand it, the phrase "standard of care" is usually used by lawyers and judges when talking about medical care. . . The use of the phrase in this context leaves the impression that Dr. Beyler's report is being written much like an expert witness report in a lawsuit-that is, Dr. Beyler is assuming the role of an advocate and not acting as an objective, independent voice. Given some of Dr. Beyler's distortions of the trial record, as described below, it may be that he has assumed the role of an advocate."

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"Contrary to what has been reported in the media, Dr. Beyler did not conclude that the cause of the fire was accidental or natural and he didn't conclude that the fire was not arson. In addition, Dr. Beyler did not prove (or apparently attempt to prove) that Todd Willingham did not murder his children."

"Dr. Beyler's suggestion, which he makes several times, that fire investigation prior to NFPA 921 was "folklore" seems a bit strong (p. 3). If that were the case, every arson case investigated prior to the late 1990s would be without a scientific basis. I don't believe that to be the case. In addition, the assertion that the science was "folklore" is inconsistent with his assertion that there was a "contemporaneous standard of care." I guess he would call it a contemporaneous standard of "folklore."

". . . I did find in my review of the trial transcript that the investigators' opinions were not phrased in terms of "more likely than not." It is an interesting legal question whether every opinion offered in a criminal case has to be "beyond a reasonable doubt" or whether the entirety of the evidence offered at a criminal trial needs to prove guilt "beyond a reasonable doubt." I must leave that for criminal lawyers and District Attorneys to argue. It isn't a fire science issue, although Dr. Beyler comments on it."

"In several places, Dr. Beyler takes exception to statements by Fire Marshal Vasquez to the effect that "a fire does not lie" and the "fire tells a story," etc. These comments aren't necessarily "mythologizing" or comments characteristic "of mystics or psychics" (p. 49). They may simply be a colloquial way of expressing what physical facts can tell an experienced investigator about what happened during a particular fire. When Dr. Beyler refers to Vasquez as a fortune teller or a mystic, he may be demonstrating a personal bias. It is not hard to be critical of a man [Vasquez] who is no longer alive to explain his statements and what he intended by those statements."

"Dr. Beyler's factual description of the Willingham incident appear to overlook or contradict many of the known facts regarding this incident. . ."

"Fireman Franks also said that after the fire, Mr. Willingham came back to his house and poured a large bottle of British Sterling cologne on the floor from the bathroom to the room in which the twins had died and said that if any more samples were taken from the floor, those samples would have cologne on them."

"No one has been able to explain how the 2 year old got out of the bedroom with the child's gate being in place. Mr. Willingham said he stepped over it going into the child's room and he stepped over it coming back out of the child's room. He was certain his 2 year old daughter was in the children's bedroom when the fire started (except when he says she woke him up by jumping on his bed) but her body was found in the master bedroom."

*"No one has been able to explain how Mr. Willingham did not sustain injuries to his feet (although his 2 year old daughter did) even though he was in the hall and, according to at least one of the versions of his escape, he kicked the front door down [with his bare feet] **while it was burning** in order to get out of the house."*

"These comments are not necessarily "mythologizing" or comments "of mystics or psychics" (p. 49)."

". . .Mr. Willingham came back to his house and poured a large bottle of British Sterling cologne on the floor from the bathroom to the room where the twins had died. . ."

"No one has been able to explain how the 2 year old got out of the bedroom with the child's gate being in place."

“Dr. Beyler is critical of the fire investigators because both the Assistant Chief and the Fire Marshal admitted that there were other possible causes of the fire. If any crime, including arson, had to be proven with absolute certainty, criminal convictions could not be obtained. The alternative theories suggested by Dr. Beyler are the sorts of things that fire professionals can readily discount. . .In support of his position, Dr. Beyler notes that cigarette lighters were found in the house. It is not an issue of fire science to decide whether a 2 year old is capable of finding a lighter, and lighting it so that a serious fire results. But, importantly there is no evidence that the lighters were found anywhere near the area where the fire burned or near where the 2 year old child was found. The fire investigators were free to discount that particular theory as being remotely possible, but not likely. The jury could evaluate that evidence. . .”

“Dr. Beyler also mischaracterized much of the actual testimony, for reasons known only to him. . .”

“Dr. Beyler also implies on page 46 that a spill of charcoal lighter fluid on the concrete front porch could account for the presence of lighter fluid under the threshold in the

house. The testimony regarding the slope of the porch (away from the front door) and the fact that there was a hole or crack separating the concrete porch from the front door appears to rule out that possibility.”

“Dr. Beyler suggests that the fire may have started in the bedroom, growing to involve the hallway. Dr. Beyler doesn’t offer any support for why the fire turned right, rather than left, if it started in the front bedroom.

The presence of an accelerant in the hallway is certainly some ex-

planation as to why the fire, if it did start in the bedroom turned right rather than left when it entered the hallway. Traces of an accelerant were found in the front door area, under the threshold. And, according to Todd Willingham, there was fire in the hallway before he opened the front door. And, Mr. Willingham said he had already opened the hallway door into the kitchen. Why did the fire turn right, not left, or not burn in both directions?”

“In summary. . . I encourage the Commission to read the trial testimony and police report (with witness statements) to establish actual testimony. . .”

“It is not an issue of fire science to decide whether a 2 year old is capable of finding a lighter, and lighting it so that a serious fire results. . .”

“Dr. Beyler also mischaracterized much of the actual testimony, for reasons known only to him. . .”

Discussion

Given my lack of training and experience in “cause and origin” and fire investigation, a critique of Dr. Beyler’s report is outside the realm of my expertise, however, Chief McMullan’s comments regarding the facts in the Willingham home fire would seem to pretty much “blow” Dr. Beyler’s report “out of the water”.

Manuel Vasquez’s investigation may have been faulty when judged by the “state of the art” as practiced in 2009, but it would appear that Vasquez reached the correct conclusion with regards to whether or not the fire was arson. It seems like common sense that good police work would also include an analysis of the suspect’s statements and actions before, during and after the fire.

Although it is outside the scope of my expertise to comment on Dr. Beyler’s report, comments on Dr. Beyler’s work before, during and after submitting his report to the Texas Forensic Science Commission would also seem to be of interest in this matter, particularly considering the importance of the matter.

On May 8, 2009, attorneys for Wal-Mart filed an appeal with the Texas Supreme Court addressing expert testimony in a case referred to as *Merrell vs. Wal-Mart Stores, Inc.* The expert testimony in question was that of Dr. Craig Beyler. On July 28, 2009, Wal-Mart’s attorneys filed additional documentation with the Texas Supreme Court. On June 18, 2010, the Texas Supreme Court issued its ruling regarding Dr. Beyler’s testimony. The following are the final two paragraphs from the Court’s ruling:

“Dr. Beyler may be qualified in fire research, but his testimony in this case lacks objective, evidence-based support for its conclusions. See Coastal, 136 S.W.3d at 232 (“[I]t is the basis of the witness's opinion, and not the witness's qualifications or his bare opinions alone, that can settle an issue as a matter of law; a claim will not stand or fall on the mere ipse dixit of a credentialed witness.” (quoting Burrow v. Arce, 997 S.W.2d 229, 235 (Tex. 1999))). Because Beyler’s testimony was legally insufficient to support causation, we do not reach Wal-Mart’s remaining issues. See Whirlpool Corp. v. Camacho, 298 S.W.3d 631, 643 (Tex. 2009).

Without hearing oral argument, we reverse the court of appeals’ judgment and render judgment that Merrell take nothing. TEX. R. APP. P. 60.2(c).”

It would appear that the Texas Supreme Court has determined that Dr. Beyler did exactly what Dr. Beyler accuses Manual Vasquez of doing in the investigation of the Willingham case. The following statement within the Court’s ruling is particularly damning:

“Most importantly, while Beyler laid a general foundation for the dangers of halogen lamps, his specific causation theory amounted to little more than speculation.”

If Beyler's investigation work and "*his specific causation theory amounted to little more than speculation*" in *Merrell vs. Wal-Mart Stores, Inc.*, it seems reasonable to ask whether or not Beyler's conclusions regarding Manuel Vasquez's investigation of the fire at the Willingham home "*amounted to little more than speculation*" on Beyler's part.

If his work in *Merrell vs. Wal-Mart Stores, Inc.* were the only gaffe that Dr. Beyler has made in his career, perhaps this could be excused, however, this is not the case.

In *Ian David McAuslin, et al v. Grinnell Corporation, et al*, litigation which followed the fire which destroyed the 1 million square foot McFrugal's Warehouse in New Orleans on March 21, 1996, Dr. Beyler acted as an expert witness for the plaintiffs. Dr. Beyler's expert report in this litigation, issued on February 5, 1999, utilized the LES3D fire model to predict the activation times of multiple sprinklers and the total number of sprinklers which would activate, as well as the effects of sprinkler spray discharge from sprinklers on a fire in rack storage. In sworn testimony in his deposition a few months later, Dr. Beyler asserted that the capability of the LES3D fire model to accurately and reliably make predictions of this information was "validated".

About the same time as Dr. Beyler was developing his expert report in the McFrugal's Warehouse litigation, Dr. Beyler was working on developing a paper on smoke/heat vents for a client, the Smoke Vent Task Group, along with Leonard Y. Cooper . The paper titled "*Interaction of Sprinklers With Smoke and Heat Vents*" includes the following statement:

"While there have been many attempts to model all or part of the interactions of sprinklers and vents, the issues are more complex than can be dealt with using even the most sophisticated modeling methods available today. The most clear indication of this is the recent NFPRF [National Fire Protection Research Foundation] research project. While modeling of the fluid mechanical aspects of the problem were quite successful in predicting aspects of sprinkler activation in the first heptane spray fire series, the model was unable to predict the corresponding results in the rack storage tests beyond first sprinkler activation."

The Beyler/Cooper paper is dated February 1999.

Hence, in the same month that Dr. Beyler issued his expert report in the *McAuslin v. Grinnell Corporation* litigation claiming that the fire model which he utilized in his analysis was "validated" for the purposes utilized, Beyler also wrote that "*the model was unable to predict the corresponding results in the rack storage tests beyond the first sprinkler activation.*" In other words, in his February 1999 paper, Beyler contradicted his own expert report in *McAuslin v. Grinnell Corporation* dated February 5, 1999.

In the summer of 2006, Dr. Beyler/Hughes Associates, Inc. once again contracted to perform work for the Smoke Vent Task Group. This work involved performing a fire modeling analysis on the interaction of smoke/heat vents with sprinklers in an effort to demonstrate that the concept of the “ganged” operation of smoke/heat vents would not have an adverse impact on sprinkler protection. Again, Dr. Beyler maintained that fire model used in his analysis could reliably and accurately predict the activation times of multiple sprinklers and the total number of sprinklers which would activate in a fire.

When Dr. Beyler’s assertion regarding the capabilities of the fire model used in his work was challenged in presentations before the ICC Code Technology Committee (CTC) in May 2008 and November 2008, Dr. Beyler maintained that the fire model had been “validated” for this purpose. After no one in the profession, including Dr. Beyler’s colleagues at Hughes Associates, Inc., stepped forward to defend Beyler’s assertion regarding the capabilities of the fire model, Beyler’s client, the Smoke Vent Task Group, concluded that Beyler’s work was “worthless”.

Given that it has been documented that Dr. Beyler provided false sworn testimony in *McAuslin v. Grinnell Corporation* and that Dr. Beyler’s client, the Smoke Vent Task Group, considers his fire modeling work on the concept of “ganged” smoke/heat vent operation to be “worthless”, it is my opinion that both Dr. Beyler’s integrity and credibility are questionable at best.

Based upon Dr. Beyler’s track record as an “expert”, combined with Chief McMullan’s rebuttal of Dr. Beyler’s report, it seems reasonable to ask whether or not Dr. Beyler is more of a “mystic” or a “psychic”, than an expert on fire science. Previously, I have expressed the opinion that Dr. Beyler is a charlatan. That opinion was expressed prior to the ruling by the Texas Supreme Court and the Court’s ruling would seem to be further support for that opinion.

Editor’s Note: Excerpts from Dr. Craig Beyler’s expert report and sworn deposition testimony in the *McAuslin v. Grinnell Corporation* litigation are included in several articles on the Commentary webpage of this website.

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