



The Lime Street Fire Test... 30 Years Later

This month marks the 30th anniversary of the Lime Street fire test, which is shown in the photo above. This test had a profound influence on my approach to fire investigations and it is no exaggeration to say that it changed my life. In 1991, my bread-and-butter was investigating suspicious fires for insurance companies. After this test, I began the “pariah” phase of my career. I remember speaking at the Florida Fire Investigators Association shortly after this case was resolved, and in general, the attendees called me everything but a Child of God. One attendee told me he was surprised that I had the “courage” to attend the happy hour.¹

I had been ready to give a deposition the next day stating that the fire patterns showed that the fire had been intentionally set, until we ran this test. My involvement started when the Public Defender, Patrick McGuinness, advised the prosecutor to double check

¹ I have never been known as someone who passes up a free drink.

the work of the Florida State Fire Marshal's Laboratory. Mr. McGuinness had seen several arson cases based on incorrect analyses by this laboratory and the prosecutor decided to get a second opinion.

The chemist, a man named Victor Higgs, identified "hydrocarbons consistent with gasoline" (language that would not be permitted today). When I looked at the gas chromatography, however, it was clear to me that the data did not support such a finding. I re-analyzed the samples, and when I opened up what should have been a can of unburned clothing taken from the suspect's surviving son, I saw that it had been overheated during the analysis process and actually caught on fire! I had never seen such a thing before and I have not seen one since.

This was not the first time I had reviewed Mr. Higgs' work, and I had found it to be invalid in three previous cases. I had the data reproduced and mailed to 10 fire debris analysts around the country, most of whom were, at that time, members of the IAAI's Forensic Science Committee of which I was also a member. All 10 respondents, as expected, replied that there was no way they would call the sample positive for gasoline based on the data.

I conveyed the unfortunate results of my review to the prosecution team, George Bateh and Frank Ashton, and they decided that because there were six fatalities involved and they were seeking the death penalty, they should seek a second opinion on the analysis of the fire scene as well. I was aware that Mr. McGuinness had engaged the services of Ron Martin and that he was likely to allege that the low burning in the living room and hallway were the result of flashover. In those days, such a position was derisively referred to as "the flashover defense."

I knew someone who had worked on at least two cases where the so-called flashover defense had been raised. John DeHaan at the time worked for the California Department of Justice. I asked him if he would be willing to work on the case and he agreed but first the prosecutor's office had to agree to pay for his services. They did. When John came to the scene, he observed that a house on the same block, apparently built by the same

builder with the same floor plan, would make an ideal site for a test fire. The house was owned by the city which had taken it for unpaid taxes and was planning to knock it over anyways.

Over the next month, the test house was refurbished and the living room, which is where the suspect said the fire started, was furnished with identical sofas and chairs. We instrumented the house to measure carbon monoxide and temperature and planed two test fires. In the first fire, we ignited the sofa, which corresponded with what the suspect said about where the fire started. This would mimic an ignition by a four-year-old playing with a lighter. We thought flashover would take 15 to 20 minutes to occur. It took three and a half. The fire patterns were remarkably similar to those in the fatal fire. The results of this test caused the prosecutors who witnessed the test to drop the charges a week later.

There is a 60-minute video on YouTube that describes the investigation in detail. It may be found at the link below. The video is still quite relevant (if I do say so myself).

https://www.youtube.com/watch?v=XmNYZIdZ_xk&ab_channel=JeremyHammond

The three investigators for the prosecution, Jacksonville Fire Department Capt. Ray Powell, John DeHaan, and myself, each wrote an article describing our perspectives on the test, which was published in the Fire and Arson Investigator in 1992. The articles may be accessed at this link.

<https://app.box.com/s/l7aw6agd1m4n4v48gklq>

The results of the test had both short-term and long-term consequences. Mr. Higgs was reassigned and taken off of casework. His laboratory director, Don Steverson, was fired, after it came out in the newspaper that Higgs was still testifying in arson trials, even though Steverson knew that his work was substandard. A new director was brought in, and things got better for a while, but even today, a finding of gasoline from the Florida Fire Marshals Laboratory is worthy of a second look, because that laboratory does not

follow industry standards in conducting its analyses. They stand by the accuracy of their work, but I have seen at least four cases where further investigation revealed that there was no gasoline.

I took the video to the IAAI annual meeting in 1992 and shared it with then-President David Smith, who asked if I would be interested reviewing a similar case in Arizona. That case, Arizona versus Ray Girdler, resulted in a conviction being overturned. I described Girdler's case in chapter 9 of my book. As a result of my work on these two cases, the nature of my practice changed as more and more attorneys who were skeptical about claims of arson decided to have them reviewed.

A twenty-year retrospective on the Lime Street fire was published in 2011. "Nightmare on Lime Street" is available in the same box.com folder that contains the articles written by the three investigators and can be reached at the link above.

NFPA 1033 update

The next edition of NFPA 1033 will be called the 2022 edition, but it will be out soon, probably before mid-summer. In my view, the standard is much improved.

The "list of 16" subjects in which a fire investigator is expected to have up-to-date knowledge is no longer in Chapter 1, but it is not gone.

Based on input from the Organization of Scientific Area Committees (OSAC) Subcommittee on Fire and Explosion Investigations, the Technical Committee reorganized the list and moved it to the beginning of Chapter 4, Job Performance Requirements (JPRs). In previous editions, the list was not logically organized, and it was redundant and unclear. In terms of redundancy, who could argue that "fire chemistry" and "fire dynamics" are not part of "fire science"? Further, NFPA 1033 was silent on what exactly it meant by some of these categories. For example, thermodynamics, the branch of physics that deals with the relationship between heat and other forms of energy is a huge field. It can be and has been argued that demonstrating that a fire investigator is

unaware of some aspect of thermodynamics not directly related to fire investigation, (entropy, for example) could be used to attempt to disqualify him or her.

Because it is important for a standard like 1033 to specify what a fire investigator should know as well as what a fire investigator is not necessarily expected to know, an extensive Annex has been added to the document, defining and placing limits on the various fields.

The list of 16 is now broken down into four general subject matter areas:

(1) Fire science, including

- a) Fire chemistry
- b) Thermodynamics
- c) Fire dynamics
- d) Explosion dynamics

(2) Fire investigation, including

- a) Fire analysis
- b) Fire investigation methodology
- c) Fire investigation technology
- d) Evidence documentation, collection, and preservation
- e) Failure analysis and analytical tools

(3) Fire scene safety, including

- a) Hazard recognition, evaluation, and basic mitigation procedures
- b) Hazardous materials
- c) Safety regulations

(4) Building systems, including

- a) Types of construction
- b) Fire protection systems
- c) Electricity and electrical systems
- d) Fuel gas systems

The only subject not included in the new version of 1033 is thermometry. The OSAC Subcommittee carefully went through each of the JPRs, in order to find references to the

subject matter areas that are now in chapter 4. All of the subjects on the list, now in section 4.1 are required by at least one JPR.

While the list of required knowledge is now more organized, fire investigators should be aware of the explanations in Annex D. For example, the following subjects are intended to be included in the term “fire chemistry.”

- (a) States of matter (gases, liquids, and solids)
- (b) Chemical reactions (fire triangle and fire tetrahedron)
- (c) Stoichiometry
- (d) Chemical composition of common combustibles
- (e) Phase changes and reactions that might require or produce energy (exothermic and endothermic processes)
- (f) Material properties (density, conductivity, specific heat, deformation, melting, vaporization, vapor pressure)
- (g) Structural properties (effect of temperatures on properties)
- (h) Combustion properties (flammable limits, minimum ignition energy, critical flux for ignition, ignition temperatures, heat of combustion, flash point of liquid, and fire point)
- (i) Fuels
- (j) Complete and incomplete combustion reaction products (combustion efficiency and role of fuel/air ratio in product composition)
- (k) The response of materials to heat (melting, dehydration, pyrolysis, charring, loss of mass, deformation, evaporation, and calcination)
- (l) Different temperature scales

So, while some people over the years have argued that certain areas of knowledge such as balancing a chemical equation like that for the combustion of hydrogen or methane is not something fire investigators really need to know, the inclusion of “stoichiometry” and “chemical composition of common combustibles” in the list makes this a hard sell. While the Annex is not part of the requirements of the standard, the Annex opens with these words:

This annex provides examples of concepts and terms for evaluating “requisite knowledge” prior to job performance requirement (JPR) evaluation. The fire investigator should have a basic understanding of the terms and concepts in the examples in D.1.1 through D.1.4 in order to successfully complete the tasks listed in the JPRs.

Each one of the 15 lettered subjects under the four general areas of knowledge has a similar explanation in Annex D.

There was considerable discussion regarding the need for an educational underpinning for an investigator’s qualifications. There was no consensus for requiring any more than a high school diploma, although it was generally recognized that many of the subjects in the list of requisite knowledge are not taught in high school.

For a view of the all the changes to the standard, go to the NFPA website, click on “Codes and Standards,” then open the list of “All Codes and Standards,” scroll down to NFPA 1033, click on “Next Edition,” and then scroll down to the bottom of the page and click on “Second Draft Ballot.” It is a 47-page document. Almost all of the changes were accepted unanimously. Only three changes drew one negative vote, so barring any exceptional circumstances, the standard will be issued as it appeared on the ballot by the NFPA Standards Council.

Disclaimer: Please note that any opinions expressed in this article are mine and do not necessarily reflect the position of the Technical Committee on Fire Investigator Professional Qualifications or the NFPA.

Florida Man Sets Himself on Fire

One of the more entertaining characters in newspapers and online is “Florida Man.” This particular Florida Man made fire investigators’ job easier than it usually is.

<https://www.oxygen.com/crime-news/scott-massa-accidentally-sets-himself-on-fire-during-alleged-arson-attempt>

For a selection of the best Florida Man memes, go here:

<https://filmdaily.co/news/florida-man-memes/>

ICAC Declares “Mission Accomplished”

The Dissolution of the Insurance Committee for Arson Control

INDIANAPOLIS, IN, FEB. 19 – Following the successful decline in severity and prevalence of arson, the board of directors for the Insurance Committee for Arson Control has made the decision to dissolve the organization. After fulfilling its vision and purpose, ICAC now wishes that its remaining resources be used to ensure the ongoing education of professional arson investigators.

The National Association of Mutual Insurance Companies will now manage these resources to fund scholarships for students interested in college fire science degrees – including arson investigation – and to provide access to ICAC’s nationally-recognized online training and education tools to fire/arson investigators in insurance companies and public service.

The ICAC board appreciates the history and achievements of ICAC over the years and its part in the success of industry efforts to combat property fire/arson as a crime and insurance issue. The ICAC was formed in the 1970s as an industry response to rising rates of arson in the US at the time. It was also instrumental in enacting arson reporting immunity legislation at a state level. These accomplishments led ICAC to develop legal and technical arson investigation training resources for the insurance industry and arson investigation firms.

The ICAC Board expresses its deep appreciation for, and satisfaction with, the history and achievements of ICAC over the years and its part in the success of industry efforts to combat property fire/arson as a crime and insurance issue.

Case Study: Bogus Science Stacked on Bogus Science

Eddie Lee Howard was wrongfully convicted and sentenced to die in 1994 based on bad science. Georgia Kemp, an 84-year-old woman who lived near Howard was found stabbed and probably raped in her home in 1992. The notorious Dr. Steven Hayne, a medical examiner with the capacity to conduct more than a thousand autopsies a year, (sometimes as many as 6 in one day) conducted the autopsy on Mrs. Kemp, and concluded that she died from two stab wounds. He found nothing to connect anyone to the crime.

Enter Michael West, the now-discredited bite mark dentist, who testified in numerous cases using a technique that only he knew to link suspects to victims. (He was dismissive of the idea of peer review.) The prosecution had Mrs. Kemp's body exhumed so that Michael West could examine it. He found what he said were bite marks on the body, though none had been noted in Dr. Hayne's autopsy report. No surprise there. West almost always found bite marks. He made a copy of Mr. Howard's teeth and said that he compared them to the marks on the body and concluded "indeed and without a doubt" that only Mr. Howard could have made the bite mark impressions. Dr. West used a special blue light in order to see the bite marks, so he could not photograph them or show them to anyone else for review. It was all just based on his "experience."

After two trials and three appeals, the Mississippi Supreme Court overturned Howard's conviction, finally in 2020 stating that bite mark analysis was not good science. Rather than letting Howard go, however, the Supreme Court gave the county the option to try him again.

In 2015, the prosecutor who had convicted Howard, Forrest Allgood, was defeated for reelection so the decision on whether to retry Howard was up to the new prosecutor, Scott Colom. While he was considering whether to retry the case, Howard's lawyers contacted me because there was another bit of bad science in the case, this time involving arson.

Mrs. Kemp's body had been discovered when a neighbor saw smoke coming out of her front door. The first eyewitness saw a small fire in the house, and the fire Department

responded and extinguished it. It was actually two small fires, so there was not much question about whether it was set. The question was when.

Mr. Howard had a solid alibi for the two hours preceding the discovery of the body and the fire, so Mr. Allgood, who may own more wrongful capital convictions than any other prosecutor, (at least 5) enlisted the services of George Bass, a City of Columbus, Mississippi fire investigator who opined that the fire had run out of oxygen and smoldered for 4 to 6 hours. I was asked to evaluate that claim.



Figure 1. Two holes burned through the living room floor. A fire investigator opined that the fire burned in a smoldering state for 4 to 6 hours, thus challenging the veracity of the Defendant's alibi.

The fire damage is shown in **Figure 1**, and a sketch of the residence is shown in **Figure 2**. Mr. Bass claimed that even though the front door was found in the open position, it could not have supplied enough oxygen to the fire to allow flaming combustion to continue. He further opined that even though the fire burned through the floor of Mrs. Kemp's

mobile home, there was skirting around the base of it and that would prevent air from coming up through the holes. (To be fair, Mr. Bass characterized his opinion as “an educated guess.”)

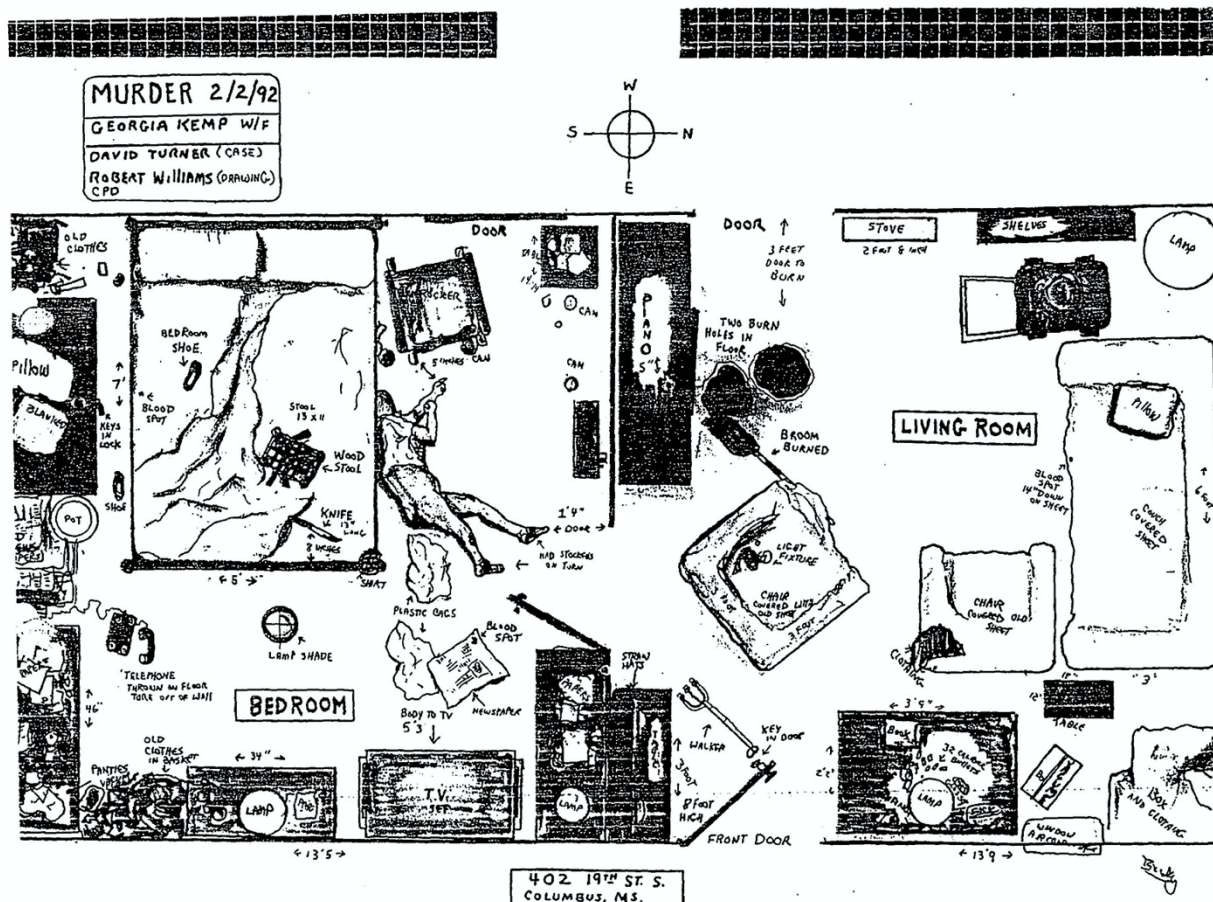


Figure 2. Detailed sketch of the murder scene.

I wrote a report available at the link below and opined that no competent fire investigator could determine that the fire burned for any longer than an hour. It was probably much less than that.

<https://app.box.com/s/hxdjnr2dbngru561o639qie25s4tnqu6>

Unable to use the bogus bite mark evidence, the new prosecutor learned that he would also have to live with the alibi evidence since the 4-to-6-hour time determination was every bit as bogus as the matching of the alleged bite mark. Mr. Howard was released in December 2020 after being held for 28 years for a crime he did not commit.

This allegation of a “slow burn” to allow for an alibi to be disputed is not the first time I have seen this tactic used, nor do I expect it will be the last.

For a detailed study of the intertwined careers of Michael West, Steven Hayne and Forrest Allgood, read *The Cadaver King and the Country Dentist* by Radley Balko and Tucker Carrington. Mr. Carrington, along with Chris Fabricant of the Innocence Project represented Mr. Howard during the appeals process.

<https://www.amazon.com/Cadaver-King-Country-Dentist-Injustice/dp/161039691X>

Additional stories about the Howard case may be found at these links:

ABA Story

https://www.americanbar.org/groups/committees/death_penalty_representation/project_press/2020/fall-2020/eddie-lee-howard-granted-new-trial/

Innocence Project Story

<https://innocenceproject.org/eddie-lee-howard-is-exonerated-after-26-years-on-mississippi-death-row/>

Dispatch Story (local newspaper)

<https://www.cdispatch.com/news/article.asp?aid=85582>

Forrest Allgood story by Radley Balko

<https://www.washingtonpost.com/news/the-watch/wp/2015/11/04/election-results-one-of-americas-worst-prosecutors-lost-last-night-but-one-of-its-worst-attorneys-general-won/>

*Scientific Protocols for Fire Investigation, Third Edition Recognized as
One of the Best Forensic Science Books of All Time!*



I'm pleased to announce that my book, "*Scientific Protocols for Fire Investigation*, Third Edition (Protocols in Forensic Science)," made it onto

[BookAuthority's Best Forensic Science Books of All Time](#)

It is #5 out of 100, and the **highest-rated** fire investigation textbook!

Reviews of the Third Edition from Amazon.com

Dr. Craig Beyler:

[A Must-Read Book for All Fire and Explosion Investigators](#)

Scientific Protocols for Fire Investigation is a must-read for every fire and explosion investigator. John Lentini is an experienced and highly regarded fire investigator and chemist. Importantly, he is also a great writer. His use of a combination of direct explanation and case studies is very effective. Through this approach, he keeps the reader's attention and brings points home more than once. His approach to writing

allows the reader to think they discovered the concepts he amplifies through case studies, firmly cementing the concepts for the reader. It's a book you will keep on your desktop.

Steve Carman:

[A Must Have \(and Must Read\) for Fire Investigators](#)

The 3rd edition of *Scientific Protocols for Fire Investigation* is most certainly a book that professional fire investigators and those seeking a more complete understanding of the science of fire investigation should have in their library. John Lentini has presented an up-to-date digest of the science and practices at the center of our profession. In recent years, the importance of understanding the role of ventilation in structure fires has gained much attention. In this book John offers readers an easy-to-read synopsis of this science and an explanation of how and why it must be at the forefront of every investigator's mind particularly when investigating fully involved structure fires.

The advancement of NFPA 921 in the last twenty years has moved our profession in a positive direction. This book takes that progression even further towards an even more thorough approach to the practice of this important forensic science.

Steve Riggs:

[Best Edition Yet](#)

I would highly recommend this edition to anyone who wants to expand their knowledge in the area of fire investigations. I have the first and second editions, but this edition is absolutely the best of all. This is a great edition to add to your personal library.

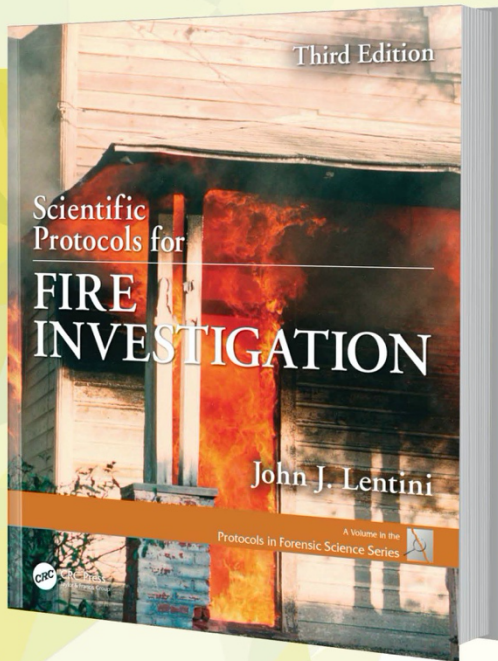
Wayne Chapdelaine:

[A Must Have Book in Every Fire Investigators Library](#)

Scientific Protocols for Fire Investigation is a text that all professional fire investigators must read.

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- Increased focus on the importance of ventilation
- New sections on Li-ion Batteries, CSST, MOVs, and electronics
- Contains the knowledge base you need to meet the requirements of NFPA 1033



The book is intended for those individuals who have recently entered the field of fire investigation, and those more experienced investigators who recognize their obligation to keep up with new knowledge. In addition, insurance professionals who hire fire investigators will find this an invaluable resource. Insurance companies have sustained significant losses by hiring investigators who are not qualified, resulting in cases being settled or lost at a cost of millions. Insurance adjusters and investigators will learn to recognize quality fire investigations and those that are not up to today's standards. Lastly, this book is for the many attorneys who litigate fire cases.

Learn more at
www.firescientist.com

What your colleagues are saying:

This book should be required reading for all professional fire investigators and those seeking to broaden their knowledge of the field.

--Steve Carman, Carman Fire Investigations, Grass Valley, CA

Lentini's brilliant monograph gives us a giant leg up in approaching the challenges of fire investigation.

--Bernard Cuzzillo, Fire Protection Engineer, Berkley CA

The enhanced Third Edition must be found on the bookshelves of any educated fire investigator.

--Douglas J. Carpenter, Principal Engineer, Combustion Science & Engineering, Inc., Columbia MD

We have a new vendor for the book, **The Fire Fighter's Bookstore** and they are offering a 20% discount off the publisher's list price. (\$79.16 + shipping) Go to:

https://www.firebooks.com/products/scientific-protocols-for-fire-investigation-3rd-edition?_pos=8&_sid=3b6cfbbf2&_ss=r

For information about setting up a **3-day course at your facility** that uses the book as a "handout," contact me directly at scientific.fire@yahoo.com

NOTE: I will be attending the 2021 IAAI ITC in Atlantic City and will have autographed copies of the book available.