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BOOK REVIEW

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Review of: *Analysis and Interpretation of Fire Scene Evidence*

REFERENCE: Almirall JR, Furton KG, editors. Analysis and interpretation of fire scene evidence. CRC Press, Boca Raton, FL 2004, 262 pp.

Analysis and Interpretation of Fire Scene Evidence bills itself as "essential for forensic scientists, insurance investigators, fire departments, and other specialists involved in the investigation of fire scenes. It also benefits attorneys and judges involved in arson cases." That may be true of some parts of this book, but it is definitely a mixed bag. When assembling a cast of distinguished authors to put together a volume like this, a light touch by the editors is frequently all that is required, but in this case, the editors' touch seems to be entirely weightless. The title is misleading, as there is very little actual guidance on "interpretation" in the book.

If the idea was to catch the attention of forensic scientists and the students of forensic chemistry to get them interested in fire investigation, then Chapters 1 and 2 are presented in reverse order. Gregg Hine of ATF provides a serviceable introduction to what it is that fire investigators do, with a goal of having the chemist not being totally baffled by the fire investigators' jargon, but this is a subject that is way too large for a 40 page chapter.

David Sheppard likewise provides a serviceable and technically correct overview of fire dynamics, but the presentation of numerous equations would have benefited greatly from the inclusion of some examples showing how real numbers fit into these equations and how they are used.

Chapter 3 on the use of accelerant detection canines is somewhat outdated (the authors refer to the "increasing popularity" of Kapak® bags for which they cite a 1991 reference) and leaves out significant parts of the history of the discussion of the validity and utility of accelerant detection canines. This chapter begins with a three-page description of fire scene inspection, the final paragraph of which includes a myth that the NFPA Technical Committee on Fire Investigations has been trying to dispel for years to wit "A hard edge to a burn, or pool burn, is classically indicative of a pool of burning liquid, mainly an accelerant or ignitable liquid. Any area with hard edges should therefore be sampled for laboratory analysis." Published work by Putorti and new additions to NFPA 921 in its 2004 edition demonstrate clearly that hard edges (or sharp lines of demarcation) are frequently not produced when ignitable liquids are burned, and are frequently innocently produced in the absence of ignitable liquids. There is an interesting discussion of instrumental field tests at the end of this chapter, and a comparison of field instruments versus canines.

Carl Chasteen's chapter on essential tools for the analytical laboratory is interesting if one is a crime laboratory director contemplating the addition of a fire debris analysis section. He intelligently discusses the choices available in separation and analytical technology, but this chapter gets more interesting for the chemist when he discusses standard operating procedures at the end.

The next chapter by Julia Dolan is one of two in this collection of eight chapters that distinguishes itself as a clearly written, well-referenced discussion of detection and characterization of ignitable liquid residues, and the fundamental science that makes chromatograms and mass spectra appear the way they do. There is a lucid discussion of the generally accepted methods of data analysis, along with consensus criteria for the identification of ignitable liquids and their residues. The next chapter, by Reta Newman, is an enlightening discussion of the history of standardization of the discipline of fire debris analysis.

The next chapter ruins the book. It is the only one entitled "Interpretation of Data," but this chapter distinguishes itself by containing more factual errors than this reviewer has ever seen in one place at one time. The contributor's approach to fire debris analysis is just wrong. The ASTM standards require that a four-peak group of C_3 alkyl benzenes be identified, but looking for those does not appear in the advice to "pattern recognition novices." Despite the fact that fire debris analysis is one of the most completely standardized forensic science disciplines, the following advice appears, "It is left up to the analyst as to how good a match between samples and standards is required to make the determination that a compound is present or ultimately, if it is a particular petroleum distillate. It may be that you wish to use a different classification scheme, or that the ASTM classification presented here will be altered." This contributor has also not kept up with the literature in that he believes that heavy petroleum distillate might be expected from roof shingles, despite the fact that the means of distinguishing shingles from petroleum distillates was published six years ago.

The "definitions" section of this chapter is truly appalling, and helps to explain why this is the only chapter in the book where

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references are completely absent. Many of the terms included have widely accepted definitions in the forensic science and fire investigation communities, yet the definitions provided are often in stark contrast to definitions published in highly respected reference materials such as *Kirk's Fire Investigation*, or the NFPA *Guide for Fire and Explosion Investigations*. Aromatics are defined as having alternating double bonds; auto ignition temperature is equated with spontaneous combustion; and the term control sample is presented with the definition for a comparison sample, with a warning not to confuse the two terms. V patterns are described as often associated with fuel pours along walls, and the entry for heat radiation is truly mind boggling: "The propagating waves of heat emitted by radioactivity; consequence of nuclear reaction."

One can only wonder what the editors were doing. They either failed to read this chapter or failed to recognize it for the horror that it is. This is especially unfair to the more distinguished contributors whose reputations can suffer from being published in the same volume.

The final chapter is entitled "New Developments and Quality Assurance in Fire Debris Analysis," and goes into great detail on the use of solid phase micro-extraction (SPME). To demonstrate the astonishing sensitivity of this technique, it is compared with ACS extraction, normalizing the SPME chart to the tallest peak, and showing bumps on the baseline for the ACS chart. There is no way for the reader to compare the other attributes of these artificially shrunken graphs. After a lengthy discussion, the authors finally concede that because SPME is so labor intensive, the best promise for this technique lies in the development of field sampling methods so rapid screening of samples can take place with portable instrumentation.

There is also a discussion of GC/MS/MS, which again focuses on sensitivity and the ability to find ignitable liquid residues even when the concentration is very low and the background is very high. What is lacking in the discussion is any consideration of the meaning (interpretation) of detecting a nanoliter of gasoline in a debris sample. If we look hard enough, we will find ignitable liquid residues everywhere, rather than finding those that are foreign to the fire scene.

Readers expecting the book to deliver on its promising title will likely be disappointed. Forensic scientists could probably make better use of their time and money than by spending it on this volume.