

BOOK REVIEW

R. E. Gaensslen,¹ Ph.D.

Review of: *Forensic Science Advances and Their Application in the Judiciary System*

REFERENCE: Sapse D, Kobilinski L, editors. *Forensic science advances and their application in the judiciary system*. Boca Raton, FL: CRC Press, Taylor & Francis Group, 2012, 283 pp. [ISBN 978-1-4398-2959-2].

This book is a collection of chapters by academics and practitioners, some nationally and internationally recognized, grouped under the broad heading of the title. There are 11 chapters, and most, if not all, could stand alone. The book is edited by a law professor and a science professor at the John Jay College of Criminal Justice of the City University of New York, home of one of the nation's oldest, well-established forensic science academic programs. [Full disclosure: I was on the John Jay faculty from 1971 through 1978, and am professionally acquainted with some of the people who wrote and edited the book.]

In the Foreword, the book's goal is said to be providing information on newer methods and approaches in the forensic sciences, and how forensic science has been an important determinant in some cases and types of cases. Thus, some chapters proceed from a legal perspective, others from cases, still others from a scientific one, and several chapters involve forensic medicine. Without explicitly stating so, the book's goals are lined up with some important recommendations made by the National Research Council report in 2009.

Chapter 1 by Danielle Sapse is a topical introduction to the law-science interface, covering some predictable and well-trodden topics (*Frye* and *Daubert* cases), and others more esoteric (chimeric DNA and the fabrication of DNA evidence). There is some discussion of class action cases and experts, as well as medical device lawsuits. Several cases that involved *Daubert* hearings are summarized. Two criminal cases, the Michael Peterson case from North Carolina and the Scott Peterson case from California, are reviewed in the context of the forensic evidence presented and factors affecting admissibility.

Chapter 2 by Prof. Kimora is a discussion of methamphetamine from the perspective of the epidemiology of the abuse problem, interdiction efforts, and treatment programs for users. The author is unapologetically in favor of "harm reduction" programs rather than treating the meth problem as a criminal justice issue.

Chapter 3 by Prof. Wallace is about molecular biology and DNA analysis, but not the standard applications. Following an introduction to the subject, molecular biology applications to

forensic analysis of botanicals, entomology, and bacteria are discussed in detail. The former two have distinct application in criminal cases, while the last is probably most applicable to the prevention and perhaps after-the-fact unraveling of bioterrorism cases.

Chapter 4 by Prof. Anne-Marie Sapse describes several examples of quantum chemical calculations applied to problems of forensic interest. One has to do with the action of two potent toxins saxitoxin (and by implication, tetrodotoxin), another with the reaction of ninhydrin and amino acids to form Ruhemann's purple, and a third with the neurochemistry of two chemicals, AMPA and kainic acid, and their binding to their respective receptors. Calculations for reactions involved in the synthesis of methamphetamine are presented as well, with the idea of confirming intermediate structure. These studies are designed mainly to help unravel chemical and biochemical reaction mechanisms.

Chapter 5 is multi-authored. It is an odd mixture of a description of some conventional, mostly familiar DNA cases, some inclusionary, and others exclusionary, followed by a physicochemical treatment for DNA purine and pyrimidine base binding with lithium and its potential applications for "aging" DNA from a scene.

Chapter 6 by Prof. Champeil discusses nuclear magnetic resonance (NMR) spectroscopy, and its applications primarily to drug identification and quantitation in the context both of conventional drug identification chemistry and of toxicology. The advantages and disadvantages of NMR are presented, and some "hyphenated" instrumental procedures (LC-NMR, LC-NMR-MS) are also discussed.

Chapter 7 by Drs. Allege and Tournel is about pharmacogenetics in forensic toxicology. "Pharmacogenetics" captures the concept that important individual variation might be observed in the effects of drugs metabolized through the cytochrome P-450 (CYP) system where there is a significant population frequency of stable genetic mutations in the CYP enzymes responsible for the metabolism. There are some clinically important examples of this phenomenon known, and as the mutations in the individual CYPs are better understood, it will likely be necessary to determine a person's genotype in the appropriate CYP in order to interpret toxicological findings.

Chapter 8 by Dr. Dedouit and many others is about the virtual autopsy. At present, the use of MSCT and MRI is exceedingly common in clinical medicine but rarely used in forensic medicine. The chapter discusses the important role these techniques can play in the postmortem investigation of both natural and traumatic

¹P.O. Box 371569, Las Vegas, NV 89137.

deaths. There is a role for them too in identifying unknown remains.

Chapter 9 by Prof. Corthals is titled "Forensic Anthropology and Human Identification in Criminal Matters," but it is primarily if not exclusively about ancient human remains and a little bit about ancient DNA, human, and microbial.

Chapter 10 by Drs. Weedn, Siebert, and Prahlow is about post-mortem chemistry. One might call this chapter a survey of post-mortem clinical chemistry, and its value in assessing the cause and manner of questioned deaths.

Chapter 11, the last one, by Dr. Reisman, is about veterinary forensic medicine and veterinarian's roles in animal cruelty cases. There is a brief discussion of the connection between family violence and cruelty to animals, but the chapter is primarily about animal cruelty issues.

This book is a collection of chapters on different topics, reminiscent in that respect of Saferstein's "Handbook" series. There is no underlying theme or unifying thread other than the idea that

it is all said to have something to do with forensic sciences. Chapters 2 and 9 are interesting in and of themselves, but it would be a stretch to say that they have much to do with forensic sciences as we normally think about it. The other chapters are also interesting, each in its own way. This book does indeed collect chapters on a set of topics rarely covered in book or chapter form. Some molecular biology background knowledge will be needed for a reader to obtain the most out of Prof. Wallace's chapter. The chapters involving physicochemical calculations will not be understandable to readers without some background in organic and physical chemistry. Similarly, Chapters 6 and 7 require some instrumental chemistry and biochemistry/pharmacology background, respectively. The book would have benefited from better editing in a few places, and perhaps better renderings of some of the figures in Chapter 8.

Generally, although, the book contains good treatment for some rarely visited topics, with lists of follow-on references, and is to be recommended to those who have the interest in and the background for exploring them.