Introduction

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The forensic sciences represent the application of knowledge and methodology in various scientific disciplines toward the resolution of legal issues. The approaches employed in case applications are evidence-driven. Practitioners must evaluate what problems need to be addressed in evidence analysis, then utilize the most appropriate scientific methodology available. Such procedures call for broad understanding of the underlying science and full awareness of the appropriate available techniques, technology and databases, as well as their limitations.

Many areas of science can be applied to problems in legal contexts, sometimes in unexpected ways. In some scientific disciplines, legal applications are relatively uncommon. For example, a zoologist specializing in the taxonomy and natural history of a particular genus of rodent may work his or her entire career without ever dealing with a forensic issue. However, if key evidence relating to the classification and behavior of that rodent genus becomes important in the investigation of a homicide, the zoologist may be needed to provide forensic perspective and to present that evidence in court.

In contrast, some areas of science are utilized routinely in the analysis and interpretation of evidence. With a growing history of forensic perspective, experienced practitioners in these areas have honed methodology specifically geared to address evidentiary issues. They have developed laboratory procedures designed to ensure the security of evidence and to maximize the information that can be extracted from it. Research has been organized and scientific approaches developed to deal with specific problems revealed through forensic practice.

This volume presents key perspective on the forensic sciences from experienced practitioners in the core areas of this endeavor. It attempts to provide a general overview of the main activities in the forensic sciences, some historical perspective on forensic science origins, international factors and current central issues. However, the volume does not represent a practical, how-to guide to forensic practice. Due to limited space, not all forensic applications are addressed.
The idea for this volume surfaced during a meeting I attended with our publisher, Wiley-Blackwell, on February 24, 2011, at the annual assembly of the American Academy of Forensic Sciences (AAFS) in Chicago. Recognizing the strong and growing academic and public interest in forensic topics, the publisher’s representative, Rachael Ballard, expressed interest in pursuing quality book projects in this scholarly area. Of course, many of our more than 6,000 AAFS members have published well-received books in their areas of expertise. As book review editor for the *Journal of Forensic Sciences*, also published by Wiley-Blackwell, I was keenly aware of the quality of those products. However, at this meeting, the publisher specifically was seeking perspective from AAFS leadership on what more could be done. I attended the meeting as AAFS President-Elect, along with then President Joseph Bono and Executive Director Anne Warren.

The inquiry strongly attracted my interest for multiple reasons. I agreed with the publisher that both public and scholarly interest in forensic science remained strong. However, much of the public interest has been met and shaped by television and popular fiction writing, in which analyses are conducted almost immediately and forensic scientists are portrayed as action figures with wide-ranging (and largely inappropriate) involvement in the case investigation. Although most of the public with whom I have discussed this issue understand that reality is likely different from that depicted by fiction, some misinformation persists among those entering our classrooms and jury pools.

For the last several years, the broader forensic science community has discussed and debated a variety of issues related to the quality of current forensic practice. Much of this discussion has focused on factors of objectivity, accreditation, certification, reliability, error analysis and the need for, and nature of, sustained focused research. Critical review has taken place at presentations during the annual meetings of the AAFS and other forensic science organizations, in the pages of our journals and in gatherings of scientific working groups.

The topics also have attracted attention on Capitol Hill in Washington, DC, where both the legislative and executive branches of the United States federal government have formed initiatives directed toward shaping forensic science reform. Along with many colleagues from the forensic, general science and legal scholarly communities, I have been an active participant in many of these dialogues. This participation has impressed on me the need for clear, comprehensive information on the current international practice of forensic science. Particular needs involve the clarification of central issues, ongoing efforts (including research) to advance the field, and thoughts on future developments from those engaged in the practice of forensic science. This perspective positioned me to respond positively to the Wiley-Blackwell inquiry.

Following the meeting with the publisher, I spent the remainder of the 2011 AAFS gathering discussing with colleagues my idea of producing an AAFS-sponsored book. After receiving a uniformly positive response to those discussions, I formally presented the concept to our Board of Directors on the final day of the conference week. A plan was formulated to create a volume that would include
perspectives from each of our 11 sections and would include international coverage. The section representatives on our board of directors would serve as the primary contacts on the project and would work with me to select the appropriate authors. Although this involved a challenging amount of work for all, the group embraced the idea with unanimous approval.

As a result of the subsequent positive review of the book proposal and formal publisher approval, author selection moved forward. Authors were chosen for their prominence in the profession, skill at writing and meeting deadlines, availability, and their knowledge of the areas needed to be covered in each particular chapter. Reflecting the structure of the AAFS and the section representation on our board of directors, chapters were organized into 11 areas of the forensic sciences. The variability within these areas, regarding the diversity of their scholarly endeavors and their slant on the forensic sciences, is reflected in the nature of author selection for the individual chapters. The research and other activities of the authors selected for the individual chapters speak to the diversity of the scholarly endeavors within the 11 sections of AAFS.

The reviewers of the original book proposal to the publisher focused particularly on the stated need for international coverage. While such perspective had been planned for the individual section contributions, reviewers felt it needed to be strengthened to ensure a global view of the central issues. Accordingly, invitations were extended to the international colleagues who had agreed to serve as plenary speakers at the 2012 AAFS meeting in Atlanta, Georgia. This invitation not only added the recommended international strengthening of the planned volume, but also provided these future speakers with a publication outlet for many of the thoughts they were developing for the conference presentations.

To encourage continuity within the volume, guidelines were provided to those writing the section contributions. The following paragraphs discuss areas and topics planned to be covered, based on these guidelines. These general goals were presented to the chapter authors at the initiation of the project.

- **In regard to practice in the forensic sciences, the authors should explore the underlying science in various types of forensic cases, the necessary training and education of the forensic scientist and the information indispensable to the public/non-specialist knowledge base. The volume also should address the origin and historical development of the forensic sciences, including its early pioneers and main contributors. Each section chapter should relate its own topic-specific history, as well as the key relative developments within the AAFS.**

- **Contributors should review key issues and how they are being addressed. Emphasis should be on scientific developments but other fundamental topics, such as accreditation, certification, objectivity and training, can be included when appropriate. Objective analysis of controversies presented with different points of view can contribute to discourse surrounding forensic science issues.**
• The authors should discuss the future directions of the field, including major research efforts underway that are likely to have high impact, as well as additional needed research particularly deserving of funding. Furthermore, expectations for future advancement and major breakthroughs should be presented.

• As an aid for future professionals, this volume should also review beneficial training and coursework for young scholars, preparing them for entry into this field. In addition, supplemental reading should be recommended by topic for those desiring added detail and perspective.

Although the above guidelines were communicated to all authors, the goal was not to limit them to these specifics. These suggestions represented my concept of the key factors that needed to be addressed and conveyed in the planned volume. The points mentioned also provided the authors with some detail on the general goals of the volume. In addition, they emphasized that the book was not going to be about specific laboratory procedures and practical methodology. In short, this volume was structured to present the thoughts of the authors on the topics laid out above. A central goal was to provide the reader with an in-house forensic look at the major disciplines represented in the global practice of forensic science.

The American Academy of Forensic Sciences is ideally positioned to provide the perspective conveyed in this volume. In 2011, with 6,260 members from the United States, Canada and 62 other countries, the AAFS can, indeed, be characterized as an international forensic organization. Founded in 1948 [1], the AAFS consists of a professional society dedicated specifically to the forensic sciences. The Academy promotes its educational and scientific objectives through publication of the internationally recognized *Journal of Forensic Sciences*, its newsletter *Academy News*, an annual scientific meeting, and conferences, workshops and policy relating to important forensic issues. Headquartered in Colorado Springs, Colorado, the AAFS represents its membership to the public, serving as a key outlet for information on the forensic sciences.

Academy members are organized into 11 sections that are represented in this volume. These sections consist of Criminalistics, Digital and Multimedia Sciences, Engineering Sciences, General, Jurisprudence, Odontology, Pathology/Biology, Physical Anthropology, Psychiatry and Behavioral Science, Questioned Documents and Toxicology. Applicants for membership must meet the general AAFS requirements as well as those specific to their section of professional interest.

Each year, in February, the AAFS holds its annual meeting. At this time, over 800 scientific papers, workshops, breakfast seminars and other relevant events are presented. The 2011 annual meeting in Chicago included 3,851 attendees, including 512 representatives from countries other than the United States and Canada. For additional details on the American Academy of Forensic Sciences, consult the official website (www.aafs.org).

This volume provides background information, international perspectives and discussions of key issues for many of the scientific disciplines engaged in forensic
applications. This effort contributes to the ongoing dialogue regarding challenges to the forensic sciences and the path toward future growth. The points of view expressed represent those engaged in the practice of forensic science, and who are well-positioned to recognize real solutions and advancement.

Reference