

ESSENTIALS OF FORENSIC SCIENCE

MICHAEL ALLEN

# FOUNDATIONS OF FORENSIC DOCUMENT ANALYSIS

THEORY AND PRACTICE



WILEY Blackwell

# **Foundations of Forensic Document Analysis**

Theory and Practice

Michael Allen

**WILEY** Blackwell

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# About the Author

Mike graduated from Keble College, Oxford University in 1981 with a degree in Physiological Sciences and went on to obtain an MSc in Forensic Science from the University of Strathclyde. In 2011 he completed his PhD with the University of Staffordshire having researched handwriting development in children.

Mike's forensic career began in 1983 in the Questioned Documents section of the Forensic Science Service laboratory in Birmingham, UK. In 1992, together with six colleagues, he helped to set up Document Evidence Limited to supply forensic document examination in the private sector to many police forces, other public bodies as well as lawyers and private clients. In 2008 Mike decided to semi-retire leaving Document Evidence but continuing to do some casework until finally retiring from that in 2013 having examined thousands of cases and given evidence in court on hundreds of occasions. He has been teaching document examination in several universities for a number of years and continues to do so.

Mike was Lead Assessor in Questioned Documents in the Council for the Registration of Forensic Practitioners from its inception and continued to play a role until its eventual closure in 2009. He has also been manager for the diplomas in Questioned Documents and Identity Documents for the Chartered Society of Forensic Sciences (previously the Forensic Science Society).

# Series Foreword

## Essentials of Forensic Science

The world of forensic science is changing at a very fast pace in terms of the provision of forensic science services, the development of technologies and knowledge and the interpretation of analytical and other data as it is applied within forensic practice. Practising forensic scientists are constantly striving to deliver the very best for the judicial process and as such need a reliable and robust knowledge base within their diverse disciplines. It is hoped that this book series will provide a resource by which such knowledge can be underpinned for both students and practitioners of forensic science alike.

It is the objective of this book series to provide a valuable resource for forensic science practitioners, educators and others in that regard.

**Professor Niamh Nic Daéid, FRSE**  
**University of Dundee**  
**Series Editor**

# Preface

## What is document examination?

Forensic document examination is a wide ranging speciality that encompasses the examination of all aspects of document production. (The one examination type *not* involved is the examination of fingerprints on documents.) There are many aspects to document production, including handwriting and signatures, the examination of machine printed documents, alterations to documents, recovering information about how and when a document was produced, together with many other less frequently encountered problems – such as determining the sequence in which intersecting ink lines were written. The knowledge and experience required by the document examiner for handwriting comparisons thus ranges from matters such as the kinds of features to be found in handwriting, the determination of line fluency or the effects of age on handwriting, to an understanding of the components of ink and how they may be compared optically and chemically, to the composition of paper (potentially to the extent of determining how to identify tree species that make up a sheet of paper), to a knowledge of how mechanical devices such as typewriters, computer printers and printing machines work.

In other words, for a practitioner to be able to examine a document as a whole, rather than just some particular aspects of it, a broad, scientific training is invaluable.

In some countries the different subsets of the document examiner's scope are indeed divided up, for example there might be a handwriting expert, a forensic chemist to examine inks, an electron microscopist to look at the components in paper and a botanist to look at the tree species present. Traditionally, in the UK, many forensic document examiners deal with most of these sub-specialities. This has the advantage that a document can be considered from a number of angles by the same individual scientist who may then be best placed to integrate the information from different examination types to reach a more meaningful overall conclusion. For example, if a questioned agreement consisting of several pages is examined and contains typed entries, a signature and some handwritten annotations, then the document examiner has several lines of enquiry to follow whereas often the focus by non-experts would only

be on the authenticity of the signature. A practitioner who only examined handwriting would therefore not necessarily be in a position to consider other lines of enquiry, such as page substitution or addition of entries at a later time.

## **Purpose of this book**

The teaching of forensic science in universities in the UK has undergone significant change over the last 20 years, going from a subject taught at postgraduate level in a couple of universities (particularly those at the University of Strathclyde and Kings College, London), to undergraduate courses in many universities. This explosion of undergraduate courses has coincided with a number of excellent textbooks being published that cover all aspects of forensic science.

The content of general forensic science courses is inevitably divided up into various disciplines covering the mainstream topics such as biological material and physical evidence. Disciplines such as document examination therefore tend to form a small part of a much wider syllabus, and it is inevitable that the vast majority of students will not be seeking to pursue document examination as a career.

The teaching of some areas of forensic science has been made more difficult because the experience of the practitioner is such a valuable and essential part of the learning experience that it is not easy to impart knowledge to students other than in a detached 'textbook' fashion. And many that teach forensic science recognise the value that teaching by practitioners brings to the students' appreciation not just of the academic content but also the practical and court-related experiences that go with it.

So why write a textbook for students on this small part of their syllabus? While the majority of students will not become document examiners, the general forensic science student textbooks can only give a fairly brief (typically one chapter) outline of the subject. This book aims to extend that coverage primarily for students who want more than they can get from a general forensic textbook but less than they would get from one of the excellent books aimed more towards professional (especially training) document examiners.

Students inevitably have a different perspective on forensic science than that of practitioners, particularly as students need to acquire academic knowledge perhaps more than practical experience, although of course the two are closely entwined. So as a textbook aimed at students, the content of this book is different in some respects from that to be found in the practitioner texts. In addition, there is a need to not presume that readers have all of the basic knowledge needed to follow the diverse topics covered in the text. This in part is a reflection of the different subject backgrounds from which students come (which is translated into diverse degree subjects amongst practising document examiners). For these reasons, there are information boxes scattered

throughout the chapters that contain what is intended to be helpful additional information for those not so familiar with some aspects of the subject.

Document examination is a very visual subject and it is inevitable that many explanations are enhanced by the use of images. In addition, it is probably the case that a good image reinforces the retention of the information in the text. For these reasons, there are plenty of diagrams and photographs to help make the words more readily understood.

Like all areas of forensic science, document examination produces a steady stream of published papers in scientific journals and forms the subject of conferences throughout the world. These rich sources of material are an important part of the subject at both academic and practitioner levels. For students, they provide an opportunity to enhance their academic understanding of the subject by digging deeper and deeper into the science behind the topics within the specialty. There are, therefore, plenty of references in the text to further reading for those minded to follow up aspects that they find particularly interesting.

In recognition of the continuing research developments and to enhance the content of the book there will be online updates detailing interesting new research papers and further worked examples to refresh the material available. To that extent, the book will always be a 'work in progress' in keeping with the steady accumulation of knowledge and technological changes over time. There are a number of topics currently that are of particular interest, including the attempts to harness the power of computers to assist the handwriting expert in a variety of contexts including automatic signature recognition (and the potential role of signatures as a biometric to identify a person) and giving some objective measures of handwriting features, the many different technologies applied to ink comparisons and a variety of conceptual approaches to dating ink on documents.

## Structure of this book

The sub-topics that make up forensic document examination are in many ways fairly conceptually separate and this makes dividing the book up into self-contained chapters easier. However, there are elements that cross examination types and these relate especially to the procedures used when carrying out practical casework.

While this book is not intended to focus too heavily on those aspects that are better covered in books aimed at practitioners, it is essential that students are given a taste of what happens in the real world of casework. In order to achieve this each chapter finishes with two sections that first describe the kinds of information that are expected to be recorded by a practitioner working a case (note taking) and second some thoughts about how cases should be reported. While it was tempting to put the note taking into a separate chapter,



as the principles that are involved are similar whatever the examination type being carried out, each different topic does require the recording of different sorts of information and hence each chapter will contain suggestions of what needs to be noted and why for the relevant topic.

At the end of most chapters there are worked examples that show how some mocked up cases could be examined in terms of notes taken and how they might be reported. The worked examples are intended to help fill the gap between *reading* and *doing* that will be familiar to many students. It is worth saying here that there are no universally agreed methods by which note taking should be done or examinations carried out. Nonetheless, the methods described in this book work and have stood the test of time for many practitioners.

As mentioned above, there are some books already available that cover forensic document examination or particular aspects of it and some of these are listed below. This book, therefore, aims to fill the gap between a chapter in a general forensic textbook and the more specialist books listed in the Further Reading section.

The author will be adding new references that are relevant as they are published and some more worked examples from time to time. Please visit [qdbook.blogspot.co.uk](http://qdbook.blogspot.co.uk) for more details.

## Further reading

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# Acknowledgements

I have always been concerned over whether there was a gap in the market of excellent books that cover forensic document examination. However, I was convinced that for students, in particular, there was a need for a book showing how the practical side of the speciality was grounded in a robust theoretical framework. The journey from theory to practice is, in my experience, not always an easy one for students to make as they don't have the daily immersion in a subject that a trainee forensic document examiner would have, for example.

I therefore have been very fortunate to have the views of a recent student and now fully qualified document examiner responding to my question: Would this book have been helpful to you as a student? I am extremely grateful to Hannah Pocock for her enthusiastic help in making sure that this book keeps its focus on its intended audience and will, I hope, be beneficial to their studies. In addition, I am very grateful to Dr Andy Platt at Staffordshire University for looking over and suggesting some amendments particularly to Chapter 7. But, of course, I take full responsibility for the content of the book, not as daunting as taking responsibility for giving evidence in court as an expert witness, but daunting nonetheless knowing that attaining perfection and pleasing all readers is impossible!

I am very grateful to those at Wiley Blackwell who have helped me along the way in the, to me, new venture of book writing, in particular Rachael Ballard, Fiona Seymour, Audrie Tan, Delia Sandford and Rachel Roberts.

It goes without saying, but I will say it anyway, that without the cooperation of my family and especially my wife Karen, finding the time to write the book would have been that much more difficult.

# About the Companion Website

*Foundations of Forensic Document Analysis: Theory and Practice* is accompanied by a companion website:

**[www.wiley.com/go/allen/forensicanalysis](http://www.wiley.com/go/allen/forensicanalysis)**

The website includes:

Powerpoints of all figures from the book for downloading

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# 1

## Introduction

Forensic document examination, like all forensic specialties, is first and foremost based on knowledge. However, there are many other important aspects to the job that should not be overlooked because knowledge on its own is not enough to ensure the competence of experts. In this chapter these other aspects are described to give the reader some idea about these issues, which are easily overlooked but which are vital if the quality of forensic procedures is to be fit to be put before the courts.

### 1.1 Historical background

Just when and where writing started is not certain, but it has been around for thousands of years and probably first appeared in the eastern Mediterranean, at least partly driven by the need to record trading transactions among seafaring nations such as the Phoenicians – who may have been the first to create an alphabet.

Whatever its historical origins, once people started to write it was inevitable that others would start to abuse the written form for fraudulent reasons. In the intervening years, the criminal motivations have probably changed very little but the means to achieve them have changed beyond all recognition.

Document examination, and in particular handwriting examination, has been a recognised specialty in the context of the judicial systems of many countries for well over 100 years. Part of the reason for its early inclusion centres on the importance of handwriting, and in particular signatures, as a mark of agreement and endorsement to authorise various business and other transactions. The need for a third (independent) party to give an opinion about the genuineness, or otherwise, of disputed signatures and handwriting can readily be appreciated.