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The Handbook

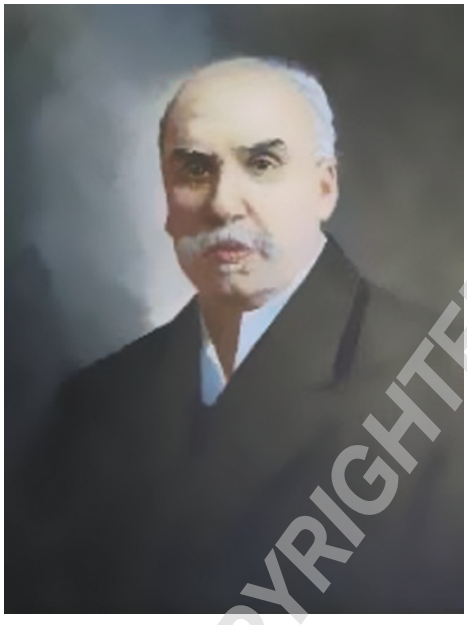
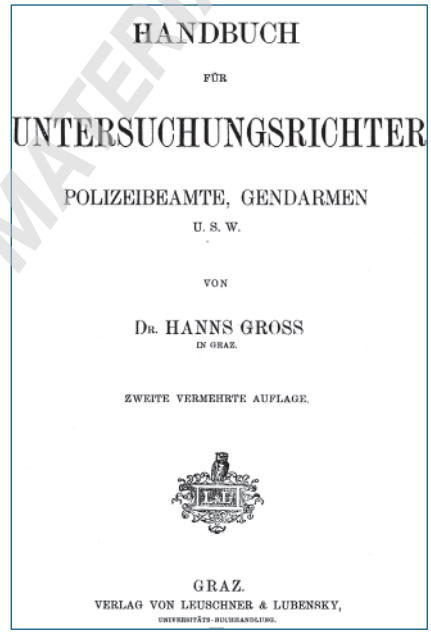


Image 1.1 Hans Gross. BP48Fadhillah/ Wikimedia Commons/CC0 1.0.


HANDBUCH

FÜR

UNTERSUCHUNGSRICHTER

POLIZEIBEAMTE, GENDARMEN

U. S. W.

VON

Dr. HANNS GROSS

IN GRAZ.

ZWEITE VERMEHRTE AUFLAGE.

GRAZ.

VERLAG VON LEUSCHNER & LUBENSKY,

UNIVERSITÄTS-BUCHHANDLUNG.

Image 1.2 Title page of the handbook. Gross (1894)/Leuschner & Lubensky/Public Domain.

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Name of the Publication

Title, *Handbuch für Untersuchungsrichter, Polizeibeamte, Gendarmen u.s.w.* which can be translated as 'A Handbook for Examining Magistrates, Police Officers, Gendarmes, etc.'. The subtitle 'als System der Kriminalistik' (as a system of criminalistics) was added to the third German Edition published in 1899.

A History of Forensic Science in 10 Publications: How They Established Current Practice, First Edition. Sean Doyle.
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Introduction

The first edition of the Handbook (as the publication will be referred to in this book) was published in 1893.[1] Its author was Hans Gross, then an examining magistrate and public prosecutor, and later Professor of Criminal Law at the Karl-Franzens University of Graz, Austria. His Handbook is by far the largest publication discussed in this book and is certainly one that, both directly and indirectly, has had a major impact on the development of forensic science and its current practice, hence its inclusion in this work.

The Handbook treats crime investigation as a scientific endeavour requiring all the skills of a research scientist for its success. It reveals that Gross was very much a member of the trace- or clue-driven school of forensic investigation, with forensic science defined as the 'science of the trace'. Fellow members of that school include Edmond Locard (1877–1966) and others, as discussed in later chapters of this book, particularly Chapter 10 on the Sydney Declaration.

Most importantly, the publication demonstrates that Gross attached more weight to physical evidence than human testimony. He considered humans better interpreters than recorders and prone to numerous potentially biasing influences. The unreliability of human testimony is explored in greater depth in another of Gross' publications, 'Criminalpsychologie' (Gross 1898).

The Handbook, among other things, sets out the principles of effective crime scene management and investigation, i.e. protecting the integrity of physical evidence, including preservation, chain-of-custody and contamination avoidance. These are principles that continue to apply to this day. It also highlights the dangers of cognitive biases such as tunnel vision, i.e. focusing on one theory or explanation to the exclusion of others. Furthermore, and presciently, the Handbook foreshadows offender profiling and the use of facial recognition as a means of identifying criminals.

The Handbook, particularly in later editions, also describes operational procedures for the recovery and examination of numerous evidence types including firearms, fingerprints, blood splatter, hair, poisons, handwriting and so on.

A measure of the importance and significance of the publication, and its impact on the development of forensic science and its current practice, is its longevity. For example, it was first translated into English by two English lawyers, a father and son, based in Madras, India. That first English edition, published in 1906, adapted and augmented the 1904 fourth German edition of the Handbook for the investigation and prosecution of crime in India at the time of the British Raj. Following that first edition in English, another five followed, the last published in 1962. In addition, there were 10 editions published in German, the last in 1978. There are accounts of the Handbook being used by police investigators at New Scotland Yard (NSY), London, up until the 1970s. Although those later English editions probably bore little resemblance to Gross's Handbook (Wilson 1952; Adam 2016).

The decline in interest in the Handbook in the German-speaking world was, in part, a symptom of its subject matter becoming less relevant in the developing academic field of criminology. Criminology is the study of crime and society's response to crime, drawing on the law and the behavioural and social sciences. The continuing use of the Handbook in the English-speaking world was partly the result of its adoption and adaptation by law enforcement agencies, particularly New Scotland Yard in London, as an instructional and operational manual.

The Handbook was also translated into several other languages including French thereby influencing Edmond Locard (1877–1966) to whom the adage 'every contact leaves a trace' is falsely attributed – the so-called 'exchange principle' – and possibly even Rudolphe Archibald Reiss (1875–1929) who in 1909 founded the Institut de police Scientifique at the University of Lausanne, Switzerland. Locard and Reiss, in addition to Gross, are pioneers in the development of forensic science. Both feature a little later in its history and are discussed in this book. Locard specifically acknowledges the debt he owes to Gross. Locard, at the time Director of the Laboratory of Police Technique Lyon in France and vice president of the International Academy of Criminology[2], wrote.

> *However, the first author who clearly described cases where this research* [studying dust for the purpose of discovering *'criminological evidence'*] *has been made is Hans Gross. One can hardly speak highly enough of the worth of this magistrate; he was one of the initiators of criminology; and he envisaged not merely a particular phase of the science, but its broadest aspects.*
>
> *(Locard 1929).*

Biography of the Publication

The Handbook was first published in 1893 with the title in German 'Handbuch für Untersuchungsrichter, Polizeibeamte, Gendarmen u.s.w.', which can be translated as 'A Handbook for Examining Magistrates, Police Officers, Gendarmes, etc.'. The contents of the Handbook were drawn from Gross's near encyclopaedic knowledge and experience gained in over two decades of structured learning and practice as an examining magistrate and public prosecutor, all poured into one extensive publication.

In Austria, as in most of continental Europe, the system of civil law applies, which is based on the inquisitorial approach of gathering facts. In this system, an examining magistrate, or justice, directs the investigation of crime and not the police or other law enforcement agents. A judicial officer may also prosecute the case, act as the fact-finder, reach a verdict and hand down a sentence; all roles exercised by Gross, but of course not simultaneously. Therefore, the civil law system was ideal for facilitating the acquisition of the knowledge and experience recorded in the Handbook. This process would have been far more difficult, if not impossible, in a common law jurisdiction such as those of England and Wales or the United States, where the role of an examining magistrate does not exist, and the police, or other law enforcement agencies, take the lead in the investigation of crime.

The distinction between the inquisitorial approach of civil law, which emphasises gathering information, and the adversarial approach of the common law system, which has many rules to exclude potentially relevant information, is crucial in charting the history of forensic science.

A consequence of the difference between the continental system of civil law and the system of common law, derived from English law, and the lack of an examining magistrate in common law jurisdictions was the slower development of forensic science in such jurisdictions, particularly in England (Adam 2016; Burney and Pemberton 2016a,b). This resulted

in what was initially described as 'police science' in the United Kingdom and United States, a blurring of the role of the forensic scientist and what is and is not forensic science. This lack of clarity continues to this day. These points are developed further in Chapter 10 on the Sydney Declaration section, as is the 'science of the trace'.

The Handbook had 10 editions in German, the seventh onwards being edited by others and the final edition published in 1978. As mentioned earlier, it was to the third German edition published in 1899 that Gross added the subtitle 'als System der Kriminalistik' (as a system of criminalistics). This was the first recorded use of the term 'criminalistics', and this is the basis for the claim that Gross is the 'founder' or 'father' of criminalistics (Block 1979a; Dillon 1977), among other offspring. However, as discussed later, Gross's meaning of the term criminalistics was closer to criminology than today's 'forensic science'.[3] Nevertheless, the Handbook is replete with scientific procedures and a reliance on scientific expertise to investigate crime successfully; today, collectively termed 'forensic science'.

The 1893 first German edition was published in two parts, part 1 in 11 sections and part 2 in 10 sections, 21 sections overall. From the fourth German Edition (1904) onwards, the Handbook was published in two volumes. The sixth German Edition (1914) was the last one edited by Gross himself. From the eighth German Edition (1941) onwards, the title was simply 'Handbuch für Kriminalistik'.

As recorded in the introduction, the Handbook was first translated into English in 1906 by the father and son barristers John Adam and J. Collyer Adam, practising in Madras, India, at the time of the British Raj. The translators adapted the text for 'India and the Colonies' (p. 13 of the Kindle Edition), and it is based on the 1904 German fourth edition, which the translators updated and modified for their jurisdictions. For practical reasons, they rejected the two-volume model; their edition is divided into five parts.

There followed a series of later editions in English edited by members of New Scotland Yard (NSY), London, and the fifth and final English edition was published in 1962, edited by Sir Richard Leofric (aka Levfric) Jackson CBE[4] (1902–1975), barrister-at-law and a member of the Criminal Investigation Department (CID) at NSY. Sir Richard was at the time Assistant Commissioner of the CID and also President of Interpol, the International Police Criminal Organisation, then headquartered in Paris, France.

The 1962 edition in English retains the basic structure of the original English edition but omits the sections on 'Wandering Tribes' and 'Superstitions'. It also updates the text to reflect the time and its use by police officers and includes new sections on Road Accidents and the Criminal Records Office, a source of intelligence, recording crimes and their perpetrators. This edition also highlights the role of Interpol in the cross-border prevention and suppression of crime.

According to Turner (Turner 1952–1953), and as recorded earlier, the later English editions included significantly less of Gross's text, with more additions by the 'editor'. This is certainly borne out by the comparative brevity and additional sections of the 1962 edition, edited by Jackson. In the opinion of Turner, what is required for an English speaker to hear the authentic voice of Gross is a translation of the 1914 edition, being the last which was the sole responsibility of Hans Gross. Sadly, no such translation has been made, so the 1906 Adams' translation is the best source on offer in English, and it is the Kindle edition that is the basis for this chapter. The English and German editions are listed in Table 1.1.

Table 1.1 List of German and English editions.

Edition	German	Editor	English	Editor
First	1893	Hans Gross	1906[a]	Adams and Adams
Second	1894	Hans Gross	1924	Adams (Jnr)
Third	1899[b]	Hans Gross	1934	Norman Kendal
Fourth	1904	Hans Gross	1949	Robert Howe[c]
Fifth	1908/6	Hans Gross	1962	Richard Jackson
Sixth	1914	Hans Gross		
Seventh	1922	Erwein Höpler		
Eighth	1942	Ernst Seelig		
Nineth	1954	Ernst Seelig		
Tenth	1977/78	Friedrich Geerds		

a. Based on the 1904 fourth German edition.
b. It was to this edition that 'as a system of criminalistics' was added.
c. A contemporary reviewer considers this edition to have little in common with Gross' Handbook, which underwent a major revision by Gross for the sixth Edition in 1914 (Wilson 1952).

Professional Biography of the Author

Hans (Johannes) Gustav Adolf Gross was born on the Feast of Stephen, December 26th, in the year 1847 in the city of Graz, the capital of the then Duchy of Styria, part of the Austro-Hungarian Empire. Part of the Duchy is now in Slovenia, but Graz remains Austrian.

Graz is Austria's second-largest city, with a population of over a quarter of a million and remains the capital of the state of Styria. By car, Graz is about 200 kilometres south of Vienna and is surrounded by green hills. It remains a picturesque location in the eastern Alps and is now a World Heritage Site with a museum dedicated to Hans Gross (University of Graz n.d.).

Gross studied law at the University of Graz and, after graduating in 1870, became an examining magistrate in the then-industrial area of Upper Styria and later a public prosecutor in Graz. He spent 30 years as a judge, a career culminating in being appointed the presiding judge of a senate (panel of judges) of the Court of Appeal[5] in Graz. It was during these three decades that Gross acquired the wide-ranging knowledge and experience that was the source material for the Handbook.

His frustration with the lack of knowledge he had acquired at university, which would enable him to uncover the truth when investigating crime, led him to engage in a period of structured self-education studying the natural sciences (biology, physics and chemistry), medicine and psychology and scientific procedures such as microscopy. These efforts eventually bore fruit in the publication in 1893 of his seminal work, the Handbook 'Handbuch für Untersuchungsrichter, Polizeibeamte, Gendarmen u.s.w.' (Grassberger 1956).

As discussed later, the natural sciences developed rapidly in the nineteenth century. The power of science and the scientific method may have encouraged or inspired Gross to look to science as a useful ally in the investigation of crime and uncovering the truth, which Gross felt was often obscured by the unreliability of human witnesses.

In 1898, while remaining a justice and having never taught in a university before, he was appointed a Professor in Ordinary for Criminal Law and Justice Administration at the University of Czernowitz, which, at that time, was also part of the Austro-Hungarian Empire. It is now part of Ukraine, close to the border with Romania and named Chernivtsi. Czernowitz has had a rich and fascinating history in the nineteenth and early twentieth centuries, but that history lies beyond the scope of this book. It is, however, a stunningly beautiful city full of nineteenth-century Habsburg architecture.

Another major achievement and of long-lasting influence was the publication in 1898 of the journal 'Archives for Criminal Anthropology and Criminalistics', in German 'Archiv für Kriminal-Anthropologie und Kriminalistik'. In addition to founding the journal, Gross was its first editor. According to Gross, the journal aimed to make criminology a practical scientific aid to criminal law (Gross 1899), echoing Gross's overall aim of providing practical guidance. In 1916, the year after his death, the journal changed its name to 'Archives of Criminology' and is still published today with the full title 'Archiv für Kriminologie unter besonderer Berücksichtigung der gerichtlichen Physik, Chemie und Medizin', making it the oldest existing criminological journal.

In 1902, Gross was appointed Professor of Law at the German University of Prague, then also part of the Austro-Hungarian Empire, and finally, in 1905, Professor of Criminal Law at the Karl-Franzens-University, his *alma mater*, in his home city of Graz.

In 1912, Gross achieved one of his life's ambitions and founded The Criminological Institute at the Graz University in the face of opposition from legal academics who felt that criminology, including what is now termed forensic science, was too narrow a field to merit even a separate area of study, let alone an institute. However, the success of the Institute can be measured by the fact that it only closed its doors in 1978, the cause being that it had failed to adapt to the broadening scope of criminology, remaining too narrow in its focus (Bachhiesl 2014).

In 1915, Hans Gross fell ill with pneumonia, his criminological institute being located in the unheated basement of the main building of the University (Bachhiesl 2014). He died on the 9th of December 1915.

As already indicated, Gross's legacy and impact on forensic science are immense.

In addition to the Handbook and the Journal 'Archives of Criminology', he also wrote a major work on criminal psychology (Gross 1905), which is now mostly of historical interest. As an indication of his legacy and impact, he has variously been called the father or founder of scientific criminology (Bachhiesl 2020), criminal research and modern police technique (Dillon 1977), scientific techniques in crime detection (Block 1979b) and criminalistics (Block 1979a; Dillon 1977), and some general biographies have included offender profiling. In addition, one of New York's most famous private detective agencies is named after him, 'The Gross Investigation Bureau'.

In introducing the French translation of the Handbook, M Gardiel, Professor of Criminal Law at Nancy, France, described Hans Gross as follows.

> *... an indefatigable observer; a far-seeing psychologist; a magistrate full of ardour to unearth the truth, whether in favour of the accused or against him; a clever craftsman; in turn, a draftsman, photographer, modeller, armourer; having acquired by long experience a profound knowledge of the practices of criminals, robbers, tramps, gypsies, [and] cheats ...*
>
> *(Adam 1924).*

Contexts

Science

As is clear from the Handbook, Gross relied heavily on science in his approach to investigating crime. The word 'science' with its modern meaning was first coined in 1833 by the Church of England priest, polymath and master of Trinity College, Cambridge, England, William Whewell (1794–1866), replacing the term 'natural philosophy'. The word has its origins in the Latin word '*sciens*', meaning knowing. As pointed out in the section on Terms, Definitions and Explanations, in its modern usage, science has two basic meanings: a body of knowledge, such as the science of chemistry and a way of finding out about the universe using what is commonly termed the scientific method. The scientific method derives new knowledge through any combination of observation, theory and experiment and then subjecting the results to peer review. It is important to note that at the heart of the scientific method is the principle that every theory is, in effect, a working hypothesis which must be tested until it is overturned or augmented by new knowledge; science accepts no certainties.

The absence of certainty in science is often a frustration in a judicial process; the Law seeks certainty to support the requirement for finality.

To understand how much the meaning of the word 'science' has changed, it is important to note that historically, the 'queen' of sciences was theology[6]!

Notable nineteenth-century scientific advances included Louis Pasteur's (1822–1895) vaccine against rabies and his advances in the understanding of disease; Dimitri Mendeleev's (1834–1907) creation of the periodic table of elements which enabled scientists to predict the characteristics of as yet undiscovered elements; the creation of electromagnetism (electricity) as a new branch of science and a better understanding of energy in thermodynamics and its conversion from one form to another. Electromagnetism and thermodynamics drove technological advances such as increasing the efficiency of steam engines and the generation of electricity.

However, by far the most important advance with an almost seismic impact on science and, more importantly, on society at large was the publication in 1859 of '*On the Origin of Species by Means of Natural Selection*' by Charles Darwin (1809–1882). The publication spawned a whole new branch of knowledge: evolutionary biology or Darwinism. It is widely considered to be one of the most important advances in knowledge in human history. Its consequences and impacts are still being felt today; for example, there is no longer a need for a creator God to explain the diversity of nature.

Unfortunately, Darwin's theory gave rise to the notion of 'survival of the fittest', which is not a consequence of Darwin's evolutionary model but an erroneous distortion. This notion led to the (false) idea, among others, that some 'races' are superior.[7] The notions of 'survival of the fittest' and racial superiority are among the defining principles of so-called social Darwinism.

This misunderstanding of Darwinism at the time also had a significant impact on late nineteenth-century criminology. As demonstrated, not even Hans Gross, with his focus on facts, rationality and logic, was immune to the influence of the Darwinian swirl of ideas around at the time. His belief in science as a means of uncovering the truth may have led Gross to the belief, in good faith, that science supported the idea of the inferiority of wandering tribes or gypsies – which of course it does not.

Hans Gross considered himself a criminologist. As mentioned earlier, towards the end of his career, he was Professor of Criminal Law at the Karl-Franzens University in his home city of Graz and established an Institute of Criminology at that University. Therefore, it is important to get some understanding of the intellectual environment into which Hans Gross emerged, i.e. criminology in the late nineteenth century. Among the beliefs of criminologists at that time, derived from their (mis)understanding of Darwinism, was that human beings had the potential to revert to an earlier stage of evolution; the process was termed 'atavism'. Therefore, one aim of criminology was to identify the atavistic criminal type and protect society by permanently imprisoning the individual so identified. Accepting the existence of these atavistic criminal types led to the notion that the punishment or sanction should fit the criminal and not the crime (Bergman 2005).

Identifying the 'criminal type' so that such types could be 'removed' from society was a major effort in late nineteenth-century criminology. In addition to the idea of an evolutionary backwards step, there was the idea that criminals had certain physical characteristics. The aim was to find those physical characteristics. This idea was exploited by Sir Francis Galton[8] (1822–1911, English) in fingerprints and by Cesare Lombroso (1835–1909, Italian) in medical physiology, all technically called anthropological criminology and tainted by social Darwinism with the notions of 'survival of the fittest' and racial superiority, which was essentially racism.

Anthropological criminology at the time attached credence to the idea that inferior 'races' are less evolved, more prone to crime and therefore more likely to be 'criminal types'. Galton stands out by being credited as the 'father' of eugenics[9] (Aubert-Maison 2009). Eugenics was based on the idea that undesirable human characteristics should be removed by selective breeding; unfortunately, a step towards the 'racial health' policies of the Nazis and the genocide of the holocaust. These ideas lead to the conclusion that criminals are born, the product of nature and not nurture, and once identified, should in some way be removed from society.

While a discussion of the *Origin of the Species* in late nineteenth century western Europe, its impact on late-nineteenth and early-twentieth-century criminology and indeed on world history is beyond the scope of this book, it is important for the reader to correctly understand the notion of 'survival of the fittest', first coined by the English philosopher Herbert Spenser (1820–1903). As stated earlier, the notion is not a consequence of Darwin's theory of evolution but is the basis of social Darwinism, which influenced many criminologists at the time. The outcome of evolution by natural selection is that the fittest survive and not the survival

of the fittest. Nature requires thousands of generations in a stable ecosystem to determine the fittest. Social Darwinists start from the position of identifying the 'fittest' in society, who then need to be protected so that they can flourish. In essence, social Darwinists misused or misunderstood the *Origin of the Species* in an attempt to provide scientific support for their bogus theories, which have been thoroughly discredited, but sadly, even today, find echoes.

In conclusion, then, there is no scientific support for the concept of a criminal type, and the racial theories and ideas of these 'fathers' of criminology – Galton and Lombroso – have been thoroughly discredited. Today's criminologists are increasingly of the view that the causes of crime lie in a combination of predisposing biological traits together with social circumstances, which lead to criminal behaviour. Neither traits nor circumstances alone inevitably lead to crime. Criminal behaviour is the product of both nature and nurture, and probably more of the latter.

Gross is on record as rejecting the work of Lombroso as statistically flawed and concluding that.

> *The truth is that there is neither criminal born nor a type of criminal.*
>
> *(Block 1979c)*

However, Gross does believe that.

> *... persons of feeble intelligence, full of hereditary defects and morally shipwrecked, fall into crime more readily than others ...* Section iii, - Examination of the accused, end of Chap II.

This reveals that Gross was not entirely untainted by social Darwinism. According to Stefan Köchel, the current curator of the Hans Gross Kriminalmuseum at the University of Graz, Gross and his successors at the Institute of Criminology often criticised Cesare Lombroso and the idea of anthropological criminology, but in fact had serious problems with distancing themselves from their own criminological ideas. After the death of Gross, so-called 'Kriminalbiologie' (biological criminology) was invented at the Institute, which later turned out to be very attractive in support of the ideology of the National Socialists in the late 1930s and early 1940s.

The adoption of science in support of the investigation of crime in the late nineteenth and early twentieth century was all part of a general trend recognising the importance of science, the realisation that knowledge was power and that many unknowns remained. The nineteenth century saw science institutionalised, the establishment of schools of science and institutions of learning.

The drive of the late nineteenth century criminologists to observe, measure and theorise is reflective of the perceived power of science and the scientific method.

History

So, having set the scientific, criminological, and, to some extent, societal scene in which the Handbook was born, the picture is completed with a word or two about the historical backdrop. The history of the German-speaking peoples in the nineteenth century is complex.

However, the following may be of relevance to the genesis of the Handbook. Victory in the Franco-Prussian War (1870–1871) led to the unification of Germany in 1871 and the creation of the German Empire under the Kaiser, Wilhelm 1 (1797–1888), administered by Otto von Bismarck (1812–1898). Although Austrians were among the German-speaking peoples and both what constituted the new German empire and Austria shared a common history as part of the Holy Roman Empire[10], of which Vienna was a recent capital, Austria remained part of the Austro-Hungarian Empire. Again, the reasons are complex, but essentially, such a union may have destabilised Europe, a risk recognised by those holding the levers of power at the time.

Because of its history, the Austro-Hungarian Empire was far more ethnically diverse than newly established Germany, and the presence of many 'wandering' tribes within that empire, together with social Darwinian ideas may partly explain Gross' intense dislike of gipsies expressed in the Handbook.

The Structure of the Handbook and Relevant Content

Introduction

The subject and aim of the Handbook are succinctly stated in the introduction to the 1906 English edition.

> *It is a Manual of Instruction for all engaged in investigating crime, its aim being, not only to deal in detail with subjects coming directly within the province of the criminal investigator, but to also inform that official in what cases and in what manner specialists may or must be resorted to.*

The Handbook is, of course, specifically aimed at an examining magistrate or the person leading or directing a criminal investigation; the 'Investigating Officer' in English translations. The Handbook contains an almost encyclopaedic knowledge of every element of crime and its investigation as understood in the late nineteenth and early twentieth century, much of which remains relevant today, hence the Handbook's longevity. It assumes the investigator has at his/her disposal, police and the necessary experts. Forensic science and the role of the forensic scientist are woven into the text as Gross recognises that science and scientific investigators are essential contributors to a successful outcome, uncovering the truth.

The Handbook is based on and gives expression to Gross's fundamental beliefs.

- The unreliability of human testimony.
- The power of science and the scientific method to uncover the truth.
- Properly managed and exploited, the crime scene will enable past events to be accurately reconstructed.

As mentioned earlier, the first German Edition of the Handbook (1893) was in two parts, the first one subdivided into 11 sections, the second one into 10 sections. However, it is

important to note that the basis for this commentary is the first English edition of the Handbook (1906), which is based on the fourth German Edition (1904). This English edition is a single volume in four parts and has 1436[11] pages.

Part 1 – with the title 'General', pages 31–484 (453 pages),
Part 2 – 'Knowledge special to the investigating officer', pages 485–727 (242 pages),
Part 3 – 'Crafts special to the investigating officer', pages 728–988 (260 pages), and
Part 4 – 'Particular offences', pages 989–1390 (401 pages).

Each part covers a series of topics and subtopics. For example, Part 1 discusses the following topics.

- The Investigating Officer,
- Examination of Witnesses and Accused,
- Inspection of Localities,
- Equipment of the Investigating Officer,
- The Expert and How to Make Use of Him, and
- The Legitimate Sphere of the Public Press

The final topic in Part 1 demonstrates a remarkably modern understanding of the benefits of a good relationship between the investigator and journalists.

Part 1 'General' is perhaps the most relevant to the current practice, management and delivery of forensic science and is therefore explored in greater detail below. Briefly, Part 1 describes the duties and responsibilities of the investigator, and the knowledge and skills required to successfully manage and progress an investigation, including crime scene management and the use of experts such as microscopists, chemists, biologists and physicists. Part 1 refers to forensic disciplines which would be recognised today, including firearms, document examination, photography and fingerprints.

Part 1 also details operational procedures at the crime scene and includes warnings to keep an open mind. It includes the requirements to accurately and comprehensively record the scene and ensure that everything that might advance an investigation is recovered and its integrity maintained. Of particular relevance is the avoidance of what is termed 'Preconceived Theories', today termed confirmational bias or tunnel vision, i.e. only recognising evidence that supports a particular theory and ignoring that which doesn't. Tunnel vision can result in a miscarriage of justice, and indeed, often has. Bias is the subject of Chapter 8.

Part 2 'Knowledge Special to the Investigating Officer' describes strategies employed by criminals, such as disguises and false identities, which the investigator needs to be aware of. This part also sets out the required knowledge for the examination of firearms and other weapons, such as knives and swords.

Part 2 also includes a major section on 'Wandering Tribes', which gives expression to the social Darwinism discussed earlier. Gross was of the view that wandering tribes, also called gypsies, were a separate class of people and by their nature were possessed of criminal tendencies, tendencies not possessed by '*... the civilised man ...*' (page 579). Those who first translated the Handbook into English, the father and son barristers John Adam and J Collyer Adam, '*adapted* the Handbook "*... to Indian and Colonial practice ...*"'. The influence of social Darwinism, essentially racism, in 'Western' societies in the late nineteenth

and early twentieth centuries is reflected in this 1906 edition. This edition finds the same class with 'criminal tendencies' among the nomadic tribes of the Indian subcontinent. This seems remarkable given the clear cultural and societal distinction between say Bohemian gypsies and the Bediyas of Bengal!

Part 3 'Crafts Special to the Investigating Officer' details the skills required by an investigator, which in the nineteenth century included drawing and modelling skills, and the detection and deciphering of secret writings.

Part 4 'Particular Offences' includes offences against the person; theft, fraud and arson. This part provides information on the methods used by criminals in committing the specified offences, including the use of weapons to inflict wounds, for example, by stabbing, bludgeoning and shooting. Poisoning and poisons are included, as are burglary/breaking and entering. The Handbook describes the 'tools of the trade' such as skeleton keys, metal files, drills and crowbars. Also included are the falsification of documents, such as passports, and the use of ignitable liquids, means of ignition and improvised timers for use in arson attacks.

Many of the topics covered in the Handbook are of their time and place, and some, such as 'Wandering Tribes' and 'Superstitions', are omitted from later English editions. Those topics, which to a certain extent reflect the racist and misogynistic views of the time, are of no significance in terms of pointing towards or contributing to current forensic science practice. However, they remain of considerable historical interest to criminologists as is Gross' other major work 'Criminal Psychology' (Gross 1918) and these two volumes, together with the journal 'Archiv für Kriminal-Anthropologie und Kriminalistik' (Archives of Criminal-Anthropology and Criminalistics), published up until 1916 under that title, are significant works contributing to the development of criminology.

Part 1 'General'

As this is the part of the Handbook that most directly links to current practice, selected sections are examined and discussed in a little more detail.

Part 1 is intended to detail the essential principles and qualities required by an investigator (p. 12) and to inform the investigator of what science has to offer. Advice is also given on the examination of witnesses and the accused, and the effective management and exploitation of crime scenes.

The Investigating Officer

Section i General Considerations, p31

Listed here is the very broad range of knowledge, skills and attributes required to be a competent investigator of crime. This includes the '*vigour of youth*' an '*acquaintance with all branches of the law*', '*languages*' and bookkeeping. In addition, '*to understand slang, read ciphers and be familiar with the processes and tools of all classes of workmen.*' The actual list is far wider and amounts to the need for a polymath or some kind of super person, which Gross seems to have been.

Section ii The Duties of the Investigating Officer p35

This text might be summarised as: investigators need to be prepared to 'go the extra mile', as the '*... culprit must be discovered at any price.*'

Section iii The Procedure of the Investigating Officer p36

Here, the Handbook includes a requirement to approach the investigation with an open mind and guard against premature conclusions which might lead the investigation in the wrong direction. It emphasises the importance of working effectively with the police and the risks and opportunities presented by that relationship. It identifies types of persons who might provide important eyewitness evidence. It then goes on to describe the *modus operandi* for certain types of crime and expresses a somewhat misogynistic view of the role of women as a potential cause of crime. A view that remains in later English editions, unfortunately.

Section iv Preconceived Theories p51

This section deals with the risk of a type of cognitive bias (error in thinking) known as tunnel vision (latching onto an erroneous theory and ignoring contradictory evidence) and how to reduce that risk. This is extremely prescient in that a recognition of the potential impact of cognitive bias did not emerge in mainstream forensic science until the early 2000s (Risinger et al. 2002). Cognitive bias is the subject of Chapter 8.

At this juncture, it is important to emphasise that, despite the warnings clearly stated in the Handbook, tunnel vision still plagues the investigation of crime, contributing to miscarriages of justice. There are far too many examples to mention everyone. A common pattern is as follows: the conviction of the 'prime suspect' based on a firm belief in the guilt of the accused by law enforcement and prosecuting authorities, supported by weak, non-existent or even fabricated evidence and later, often decades later, exoneration based on DNA evidence. Two recent examples are Andrew Malkinson in England (Dugan 2023) and Archie Williams in the United States (Bastian 2021), and for an idea of the scale of the issue, see the report of Gould (Gould et al. 2013). One of the most powerful examples of tunnel vision leading to miscarriages of justice – well, actually just wrongful convictions – at an industrial scale is the so-called Post Office Scandal in the United Kingdom (Willis 2021).

The Handbook draws attention to behaviours that result in tunnel vision. '*... an opinion is formed which cannot be got rid of ...*' and therefore, '*... the details of the case are no longer studied with entire freedom of mind ...*' (p52)

Gross's insights into the dangers of cognitive bias and tunnel vision as recorded in the Handbook are, with hindsight, extraordinary. Although the potential for cognitive bias to distort scientific conclusions had been recognised since the writings of Francis Bacon in the seventeenth century (Bacon 1620) it seems clear that the risk of such bias had not been fully recognised in the late nineteenth century, and, as mentioned above, not until the late twentieth in mainstream forensic science, as discussed in Chapter 8. It should be noted in passing that Francis Bacon is considered by some to be a major contributor to the concept of the scientific method as it is currently understood (Stanford Encyclopedia of Philosophy 2012).

It is also interesting to note that Gross unknowingly recognises the power of the prior probability[12] in Bayesian inference, which is defined in the section on Terms, Definitions and Explanations and discussed in Chapter 6.

> *... where the problem is whether a violent death is caused by suicide or by unknown causes. ... It is safe to affirm with certainty that an enormous proportion of such cases is due to the hand of another.* (p56)

Section v Certain Qualities Essential to an Investigating Officer p60

Here, the Handbook specifies the requirement for accurate record-keeping.

> *... he* [the Investigating Officer] *must set out details in the official records exactly as they have been seen or said, for it goes without saying that this will be so done.* (p62)
>
> *Since 'exactness', or accuracy of work, is of so much importance in all branches of research, this accuracy must also be applied to the work of the Investigating Officer.* (p63)

Here, Gross emphasises his point that investigating crime is akin to conducting scientific research, and the same rigour must be applied.

Inspection of Localities

Section i Preparation p213

This section highlights the importance of effective crime scene recording; any errors made at the scene could well render any further progress redundant.

> *His report of an inspection of localities is a real touchstone for the Investigating Officer. In no other duty are address, power of observation, logical reasoning, methodised energy, and keeping the end ever in view, so clearly revealed; ...* (p213)

To properly and thoroughly manage and exploit a crime scene, a competent assistant is considered essential.

Section ii What to Do at the Scene of Offence p217

The potential for cognitive bias and tunnel vision is emphasised again, this time in the examination of the crime scene. Any mistakes made at the crime scene must be recognised and immediately corrected.

> [Preconceived theories] ... *frequently causes him* [the crime scene examiner] *to go wrong in his reckonings. For this reason, the faults of his first impression must be corrected on the spot and his plans and intentions modified accordingly.* (p219)

In the Handbook, Gross, in a demonstration of the breadth of his scholarship, quotes the Catholic theologian and Doctor of the Church, Saint Thomas Aquinas (1255–1274) in Summa Theologica, who, following Aristotle, teaches that the circumstances affecting a human act are comprised under these seven heads.

> *Quis, quid, ubi, quibus auxiliis, cur, quomodo, quando?*
> *Who, what, where, with what, why, how, and when?* (p219)

These heads are interpreted as follows.

> *What was the crime, who did it, when was it done, and where, how done, and with what motive, who in the deed did share?*

The Handbook recommends committing these words to memory, '*... to prevent many a grave mistake.*' (p220)

In acquiring, critically assessing and interpreting eyewitness accounts, the Handbook recommends keeping eyewitnesses separate from each other to prevent them from exchanging information and potentially weakening the probative value of their testimony through collusion. With this measure in place, Gross attached significant weight to corroborative eyewitness accounts.

The Handbook emphasises the importance of excluding events, particularly the movement of items or persons, that occurred after the crime was thought to have been committed.

Section iii The Actual Description of the Scene of Offence p224

Here, the Handbook draws attention to the importance of accurately recording everything that might be of evidential value, however unlikely, before items are moved. The scene must be recorded in its undisturbed state.

The rule given regarding scene preservation is as follows.

> ' *... never to change in any way the condition of the scene before it is described in the report.*' (p225)

Many modern crime dramas have the first responder moving items at the scene contrary to the Handbook's guidance and demonstrating the gap between fiction and the proper investigation of crime. Moving items or altering the scene in any way prior to recording may undermine the investigation and call into question the integrity of any evidential items recovered.

Guidance is then offered on the structure and general requirements of the description of the scene report. A detailed method of scene recording is documented, and the need to avoid inexact or ambiguous language is emphasised.

The importance and significance of, and how to record, bloodstain patterns are described in detail. Bloodstain pattern analysis following a violent crime is now a major activity within forensic science (Hanson 2004).

Many examples are given where what seemed trivial or unimportant at the time of the crime scene examination turns out to be the '*... pivot on which the whole case turned*;...' (p232)

The Handbook recommends that a sketch plan of the scene be made initially before writing and then annotated with written detail. Today, the scene would be sketched, photographed and, in some cases, a virtual scene created.

The need to distinguish clearly between subjective and objective evidence is stated.

Foreshadowing the use of cadaver dogs, the use of canines for the detection of corpses and tracking fugitives is recommended.

Equipment of the Investigating Officer p243

Listed here are items considered indispensable to the Investigating Officer. It being the early twentieth century, it consists mainly of appropriate stationery, but also lists, a tape measure and a pair of compasses. Interestingly also recommended is a pedometer placed in the investigator's boot for measuring distance. A cloth for collecting blood and Plaster of Paris for recording and preserving footprints and other impressions are also listed. All essentials to be carried in a '*Commissionstasche*' or field bag.

One very amusing passage has the following advice.

> *Smokers should always have a few cigars in reserve, for how often does not one in his haste forget his cigar case. A post mortem, for instance, is not a very pleasant thing for the mere lawyer, if he cannot smoke; even the brandy flask may be a very present help in such circumstances.* (p250)

The Expert and How to Make Use of Him

Section i General Considerations p252

In this section of the Handbook, Gross acknowledges the uncertainty at the heart of science, and he clearly understands the consequences that expert opinions often need to be qualified. Readers need to note that the lack of certainty in science is sometimes difficult to understand by non-scientists, including police, lawyers and judges.

The Handbook provides examples of experts beyond medicine and science who can advance an investigation but warns against pressuring them to offer opinions that won't withstand scrutiny. For instance, what was once considered impossible and led to unqualified certainty, such as the positive detection of an illicit substance, is now known to be possible in the form of a false positive result. Science evolves and progresses, uncovering new knowledge that challenges and may overturn earlier certainties.

Section ii Role of the Medical Jurisprudent p261

Regarding the certainty with which conclusions are offered, it may be helpful at this juncture to make a distinction between science and medicine. Medical practitioners are inclined to be very certain in their own minds of their opinions and present them with great confidence, even when erroneous; the story of Professor Sir Roy Meadow[13] and his evidence regarding sudden infant death syndrome (SIDS) is a good example (Dyer 2005). In addition, medical practitioners tend to rely heavily on abductive inference (Veen 2021), an educated guess based on knowledge and experience. In this type of reasoning, the simplest and most likely explanation for an observation or set of observations is sought. The risk is that the true explanation may lie beyond the knowledge and experience of the medical practitioner. Where the conclusion has a definite uncertainty associated with it, this uncertainty tends to be put to one side by the medical practitioner. There is rarely much evidence of the consideration of alternative explanations in the testimony of medical practitioners.

Scientists, on the other hand, are aware of the uncertainties associated with their opinions, or at least should be, and make use of the scientific method. This involves inductive and deductive reasoning to test explanations generated by abduction[14], as appropriate, and refining those explanations, including alternatives, in arriving at and offering opinions which are nearly always qualified and expressed in terms of a likelihood or probability. In addition, as discussed later in Chapter 6, forensic scientists tend to increasingly rely on Bayesian reasoning[15] when reasoning under uncertainty. So, while the Handbook offers a whole section of guidance on what is termed medical jurisprudence, it is not strictly science and as such it is beyond the scope of this book. However, it should be noted in passing that the topics include preserving parts of a corpse, tattooing, mental afflictions and hypnotism.

As an interesting aside, there is also much written in the Handbook about the relationship between an investigator and the medical jurisprudent known more recently as a forensic pathologist or medical examiner. That this relationship should be close and amicable (p261), such as to produce a '*... lively enthusiasm and active cooperation ...*' is recommended '*... as their collaboration will considerably aid the solution of the problem*.' (p262). It is of interest to consider how many successful fictional crime dramas, in books, plays and/or films, have been based on such a relationship between the medical examiner (however named!) and the investigator.

Section iii The Microscopist p310

A. Traces of Blood p312

In addition to being able to distinguish between blood and other stains, extraordinarily, the microscopist can measure 'blood globules' and by so doing distinguish between an animal or human source.

Bloodstain pattern analysis is also described and used to distinguish between arterial and venous blood splatter.

B. Excrement p319

This is not a common evidence type. However, the Handbook foreshadows the monitoring of wastewater to detect evidential substances (Hauser et al. 2019), so-called 'sewage forensics'. The Handbook claims that distinctions might be made between faecal matter, mainly of vegetable origin, and that of meat and linking types of seeds to a location. The earlier comments about medical practitioners and their reliance on abduction are supported by the following quotation.

> *The state of digestion of the figs exactly corresponded with the time which had elapsed between the eating of the figs and the murder of the girl.* (p320)

C. Hair p321

Hair is a more commonly encountered evidence type today, although weakened by scandals such as those at the FBI (FBI 2015). A standard work of the time is quoted.

> Dr Emile Pfaff's, *'The hair of man, its physiological, pathological and legal importance,'* (p321)

Regarding hair, the Handbook has.

> *We should in the first place not lose sight of the faculty of absorption possessed by human hair; it is capable of absorbing gases, odours, etc., with extreme facility and retains them for a relatively long time.* (p321)

Guidance is given on the recovery of hair, contamination avoidance and appropriate packaging. The Handbook emphasises, not for the first or last time, the need for precise and complete recording of those steps to prove the integrity of the evidential item.

Among other circumstances discussed and examples given is the potential for the exchange of pubic hair between a complainant and an alleged perpetrator in cases of alleged sexual connection.

In this section, there is an early example of offender profiling following the recovery of two hairs from a hat dropped by an assailant as he fled the scene. Based on the hair examination, it was '*concluded*' that the hairs belonged to a '*dark*' man, still fairly young but who was beginning to grow grey. He had recently had his hair cut, he was beginning to grow bald and '*inclined to stoutness*'. It was concluded that the assailant was ...

> *A man of middle age, of robust constitution, and inclined to obesity: black hair intermingled with grey hair, recently cut; commencing to grow bald.* (p329)

Interestingly, Gross in the Handbook claims that the approximate age of a person can be estimated by the rate of dissolution of a hair root in a solution of potassium hydroxide, of unspecified concentration. He claims that the hair root of children will dissolve immediately, but that of older people will dissolve in a matter of hours. No current scholarship can be found in support of this phenomenon.

There follows quite a treatise on hair examination, its morphology and evidence of treatments. In addition, the resistance of hair to post-mortem decay is noted.

Although stated in relation to hair, the Handbook draws attention to the fact that scientific evidence is most powerful in the negative, when it excludes, without doubt, a suspect from an investigation. This exculpatory power is most in evidence today in the work of the Innocence Project, (The Innocence Project 2023), in which current DNA profiling techniques are being used to exonerate those wrongfully convicted – ironically, many of those convictions were based on unreliable hair comparison evidence (FBI 2015).

As a warning against placing too much reliance on a particular evidence type and that evidence misdirecting the investigation and risking a wrongful conviction, the Handbook describes a case where two eminent hair examiners, finding a rare and unusual feature common in both the questioned and reference hair, identified a suspect who was later found to be innocent of the crime.

D. Other cases relating to Medicine p335
Here, the Handbook refers to toxicology and poisoning using plants.

E. Falsification of writing p339
The Handbook describes all the relevant elements, the pen, ink, paper, and seals, together with bleaching and other erasure techniques, in a reasonably comprehensive treatise.

F. Examination of Cloth, Woollens, Linen, & c. p340
The characteristics of cloths and paper are described together with the examination of fibres and the importance of fibre evidence.

G. Examination of stains p343

1. On Weapons and Tools p344
Here, and elsewhere in the Handbook, casework examples are given in which the instruction to the expert had been narrow or restricted and, as a result, has deprived the expert of relevant information, risking vital evidence being overlooked or missed. This is a lesson perhaps for jurisdictions that employ a market approach to forensic science, where forensic science provision is commoditised and compartmentalised, potentially denying experts relevant information, resulting in the production of misleading evidence. The point is also supportive of the model presented in the Sydney Declaration, the subject of Chapter 10.
Earth, dust, fibres and dried-up liquids are mentioned, as is dirt under fingernails.

2. Dust p348
The characteristics and composition of dust from various locations are described, e.g. the desert, a ballroom, and clothing from various persons.
The beating and shaking of garments and the collection of particulates obtained are described. This can shed light on the history of a person during the time the garment was worn.
Examining dust on other items, such as knives, might yield important evidence.
The examination of dust links Gross with Edmond Locard, and although not explicitly stated in the Handbook, Gross is clearly aware of the 'exchange principle' (every contact leaves a trace) and its probative value. In one of his publications, Locard duly acknowledges the debt owed to Gross (Locard 1928).

3. Stains on Clothes, etc. p352
This section focuses mainly on blood and spermatozoa.

4. Mud on Footwear p354
As evidence of location, types of soil and other evidence of location, e.g. flour attached to footwear.

Section iv The Chemical Analyst p355

The analytical chemist is considered to have the most value in cases of poisoning, to identify suspected toxic substances, which today is the discipline of toxicology.

Section v The Expert in Physics p359

According to the Handbook, the physicist can provide information on the flight or trajectory of projectiles, i.e. ballistics, the effects of light and the positions of the sun and moon in corroborating eyewitness testimony. The physicist might also shed light on the influence of weather and on the forces producing the effects observed, such as damage to items, breakages, tears and splits. While probably beyond the competence of a physicist, the Handbook also suggests that such an expert might provide useful insights into accident investigation and structural collapse.

In this section, the Handbook recommends that the investigator keep up to date with developments in the natural sciences (chemistry, physics, biology and geology) to ensure new developments that might be applied to the investigation of crime are identified and utilised.

Section vi Experts in Mineralogy, Zoology, and Botany p366

Mineralogists might determine the nature of a mineral to reveal the origin of the recovered dust, soil, or stains. Zoologists can measure the dimensions of '*blood globules*' and thereby suggest a source, and botanists can identify poisonous plants and types of wood which might be of probative value.

Section vii The Expert in Firearms p370

Much is written in the Handbook about the chemical analysis of bullet lead, from the projectile itself and residue in the barrel of the firearm, to link one to the other.

The Handbook includes an intriguing series of chemical tests used to determine the time elapsed since a firearm was discharged. (p375)

Section viii Handwriting p375

In the Handbook, by handwriting, Gross initially seems to mean graphology – the determination of personal traits based on handwriting features – a largely discredited practice which, even if it were successful, only reveals the personality of the author. While acknowledging that it might have utility in the future, Gross treats it sceptically. Graphology should be contrasted with Locard's graphometry discussed in the next chapter.

There follows a lengthy treatise and what is currently understood as the examination and comparison of handwriting, including forgery and traced forgery.

Section x Anthropometry – Bertillon System p439

The anthropometric system of identification involved the measurement and recording of certain physical characteristics, was developed by Alphonse Bertillon (1853–1914) in 1879 in the Paris Police Department and was for some time highly valued and utilised by many law enforcement agencies both in France and elsewhere. The system involved measuring certain dimensions of the body of criminals, e.g. the head and face. The 1906 English Edition of the Handbook describes the system in some detail. Bertillon's anthropometric method is discussed further in the next chapter.

Section xi Finger-Prints p445

While praising the anthropometric system of Bertillon for identification, this 1906 edition of the Handbook lists its disadvantages.

1. The instruments are expensive, easy to spoil, and can only be obtained from certain suppliers.
2. The persons who carry out the measurements must have had a special and complete course of instruction.
3. The measurements of the body can only be taken at appointed measuring stations, and by appointed measurers.

4. If the measurements are not properly taken, or being properly taken are then wrongly read or transcribed, the mistake cannot be discovered at the office where the records are kept, and thus all chance of a successful result is spoilt.
5. The taking of the measurements demands time, for to be reliable, they must be repeated three times.
6. It is necessary for the body to be partly exposed.
7. The measurements of young people alter as they arrive at maturity.
8. Double search is often rendered necessary.

The advantages of fingerprints are then listed for comparison.

1. The necessary accessories – a piece of tin, a bit of India rubber, and printing ink- are, above all, cheap and easy to procure.
2. Any person can, after half an hour's practice, take clear fingerprints.
3. The fingerprints can be taken by any policeman at any place.
4. To check a sequence of recorded fingerprints, the comparison of a single impression suffices.
5. The prints of the whole 10 fingers can be taken very much more quickly than body measurements.
6. It is not necessary for a person to remove his clothes.
7. The pattern of a fingerprint never alters during the life of an individual.
8. Mistakes being impossible, no second search is necessary.

Apart from 8, all other points are as valid today as they were when the then.

By highlighting the disadvantages of anthropometry and the advantages of fingerprints, Gross heralded the decline of anthropometry and the rise of fingerprints as a standard means of establishing the identity of criminals. The Handbook goes on to describe in some detail how to record fingerprints, their main features and their forensic utility (p448).

Even with the advent of facial recognition and DNA profiling, fingerprints currently remain an important tool in the investigation of crime and establishing the identity of criminals.

Section xii Geometrical Identification p471

This section refers to the proposal of a W Mathews (British Journal Almanac 2590 p412) using what we would now call facial recognition. Recognition was based on a comparison between photographic images of the face and making certain measurements/measuring certain distances, which were believed to change little over time, for example, the distance between pupils. Questioned and reference photographs are cut along either the horizontal axis of the pupils or through a vertical axis, being the central line intersecting the nose and lips. If the questioned and known photographs fit, then identity is confirmed.

Impact at the Time

The Handbook records the earliest use of the scientific method in the investigation of crime, a revolutionary approach at the time. It emphasises the rigours and benefits of that approach in uncovering the truth and solving crime. It is therefore the first major treatise

on forensic science, certainly in Europe. It stresses the need to distinguish between objective and subjective evidence and the preference for the former, attaching more weight to physical evidence than to human testimony, which is considered less reliable.

The Handbook's impact is evident in its immediate translation into several languages and its adoption by investigators in both civil law jurisdictions, such as continental Europe, and common law jurisdictions, including the United Kingdom, as both an instructional and operational text. Later pioneers, such as Locard, acknowledged their debt to Gross and his Handbook.

In promoting fingerprints as a means of identification and highlighting the disadvantages of the anthropometric system of bodily measurements, later editions of the Handbook effectively sounded the death knell for anthropometry.

In terms of trace evidence, and principally regarding the examination of dust, the Handbook recognises the 'exchange principle' later attributed to Edmond Locard. Among the circumstances discussed and examples given is the potential for the exchange of pubic hair between complainant and suspect in cases of alleged sexual connection.

Impact Today

The Handbook documented operational procedures for the appropriate examination of numerous evidence types, including toxicology, hairs and fibres, body fluids, firearms and so on. This presaged the multi-disciplinary approach to the investigation of crime normally employed today.

As reported earlier, the fact that, in some form or other, the Handbook continued in service until the 1970s, certainly among the detectives at New Scotland Yard, London, United Kingdom, as an instructional and operational manual, bears witness to the lasting impact of the Handbook and the brilliance of its author.

It echoes the call by many authors in this book to beware of the 'preconceived ideas' resulting in tunnel vision.

Contribution to Current Practice

Perhaps the greatest contribution to the current practice of forensic science is in the scene principles elucidated by Gross, of control, preserve, record and recover, which remain fundamental to the forensic exploitation of a crime scene.

Control – restrict access to essential personnel and record all activities

Preserve – establish and maintain the integrity of the scene and all items at the scene

Record – record the scene in detail in its original state

Recover – recognise and recover items of potential evidential value according to a plan

In common law jurisdictions, the impact on current practice comes via police investigators. A detailed method of scene recording is documented, and the avoidance of inexact or ambiguous language is emphasised. The Handbook stresses that the scene must be recorded accurately in its undisturbed state. Guidance is given on the recovery and packaging of evidential items and avoiding contamination. The Handbook states the

need to record precisely and completely the history of recovered items as a means of demonstrating integrity, i.e. every evidential item must have a record of its continuity or chain of custody.

The Handbook must be considered a foundational work in forensic science and has played a significant role in its development and in contributing to current practice.

Concluding Remarks

Having established several fundamental principles of crime investigation, particularly crime scene management and investigation, and extensively documented practice in support of those principles, of all the paternities assigned to Gross, the father of crime scene investigation is perhaps the most fitting.

The Handbook stresses the requirement for an open mind when investigating crime and guarding against hasty conclusions that might lead the investigation in the wrong direction. This is a recognition of the risk of latching onto an erroneous theory and ignoring contradictory information, a form of cognitive bias known as tunnel vision.

Among other things, the Handbook presages facial recognition, offender profiling and 'sewage' forensics.

Finally, the fundamental utility of the Handbook in the investigation of crime, its tactical and operational aspects, drawing on information from various sources and the early recording of forensic science practice can best be measured by its translation into many languages and its longevity from 'birth' in 1893 to the final German edition some 80 years later.

Later English editions of the Handbook were used by detectives at NSY, London, United Kingdom, as both an instructional and operational manual for crime investigation until the 1970s.

Key Takeaways

The Handbook was the first to:

- Employ the scientific method in the investigation of crime.
- Document the fundamental principles of crime scene management and investigation; control, preserve, record and recover.
- Identify the purpose of crime scene investigation as reconstructing past events.
- Recognise and give weight to the superiority of physical evidence over human testimony.
- Highlight the risk of cognitive bias and describe measures to reduce that risk; to avoid preconceived ideas and keep an open mind.
- Caution against the use of inexact or ambiguous terms.
- Coin the term 'criminalistics' but not as understood by later forensic scientists.[16]
- Document examination procedures for numerous evidence types.
- Detail the trace-driven model of forensic science repeated in the Sydney Declaration (Chapter 10).

Notes

1 Some sources have 1891. However, in this book, 1893 will be taken as the year of first publication.
2 In French the term 'Criminalistique' is used in the title of the Academy. The exact meaning of 'criminology' and 'criminalistics' in the late nineteenth and early twentieth century is unclear. See the section on Terms, Definitions and Explanations.
3 There is some suggestion that by adding the subtitle, Gross was merely emphasising the fact that it was a manual for the scientific investigation of crime, a marketing ploy.
4 Commander of the Order of the British Empire.
5 Courts of Appeal are often the highest courts in a jurisdiction unless there is a Supreme Court.
6 According to Thomas Aquinas (1255–1274).
7 There was a long-held popular view of 'Western superiority' that, for example, Africans (and later Jews) were in some way inferior. To some, Darwinism seemed to provide scientific support for these racist views: it did not.
8 A cousin of Charles Darwin.
9 It is beyond the scope of this book, but eugenics was remarkably popular even among so-called 'progressives' and retained the support of many, including some leading politicians and scientists until the 1940s. However, the atrocities of WW2 put paid to such racist notions for most right-thinking people.
10 Which, according to the French writer Voltaire (1694–1778) was neither holy nor Roman nor an empire!
11 All page numbers are from the Kindle edition of the 1906 first edition in English.
12 Also known as the base rate. In the case of suspected suicide, murder is the more likely explanation.
13 Meadow was also the author of the controversial Munchausen's syndrome by proxy.
14 The three methods of reasoning, abduction, induction and deduction, are described in the section on Terms, Definitions and Explanations. Abduction involves generating reasonable explanations, while induction involves testing those explanations or hypotheses, which are then refined by deduction.
15 Bayesian reasoning, a probabilistic approach, is discussed and described in the section on Terms, Definitions and Explanations and the chapter in interpretation Chapter 6
16 Criminalistics in the mind of Gross was closer to criminology, the study of crime in its broadest sense, while later forensic scientists meant the exploitation of physical evidence; see Terms, Definitions and Explanations and Chapter 10.

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