

FOOD INDUSTRY FORENSICS

PART ONE: TO ~1910 (Conan Doyle, etc.)

PART TWO: Food Technology Forensics to ~1950

***PART THREE: Food Industry Forensics Including
Authenticity, Traceability, Quality Assurance,
and International Standards***

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THE ORIGINS OF FORENSIC SCIENCE

- **From The French Revolution through Sir Arthur Conan Doyle's time**

AND

- **Why/how Sherlock Holmes was up to the minute in deploying the latest technology**

FROM SHERLOCK HOLMES TO NOW

Each generation interprets and understands a previous group's lessons and teachings in its own fashion.

Sir Arthur Conan Doyle (1858-1930)

- Doyle was initially a physician and ophthalmologist, and later a newsman highly aware of visual clues.
- He was the first scientifically trained novelist to use CURRENT forensic activities as the basis for his continuing character development. He became a great story-teller by using his diagnostic training, love of drama and scandal, and current events.
- His models for the observational and deductive powers for Sherlock Holmes was his teacher, Prof. Joseph Bell, M.D. who was an early criminologist and CSI, and himself. The physical and social model for Watson was Doyle himself.

CSI Under the Gas Lamps (pre-Edison)

- **In a “Study in Scarlet” Sherlock “... whipped out a tape measure and a large round magnifying glass from his pocket.”**
- **Criminologists (professors) were ahead of Criminalists (practitioners) in demanding the crime scene be kept untouched until the evidence and details could be fully captured by the trained investigators.**

Sherlock Holmes

- 1854 – Birth
- 1874 – Begins College and is advised to become a detective (Gloria Scott)
- 1876 – Leaves college for independent study
- 1879 – First Case (Musgrave Ritual)
- 1881 – Meets Watson and begins Agency
- 1903 – Retires until 1914, then retires again
- Agency exists 23 years (17 with Watson)
- A.C. Doyle contributes from 1887 to 1930
- Queen Victoria reigns from 1837 to 1901

The Sherlock Holmes Agency

PEOPLE

A.C. Doyle, M.D.– Founder, Marketing / Bus. Developer

S. Holmes – Forensic Consultant / Sr. Partner

J. H. Watson, M.D. – Medical Consultant / Partner

M. Holmes – Government Liaison

M. Hudson – Office Manager

Wiggins – Sr. Investigator

Baker Street Irregulars – Investigator Agents

Toby – Suspect Tracking Expert

Gregson, Lestrade, Queen Victoria, etc. – Clients

RESOURCES

Library and Databases (soil, tobacco ash, poison)

Deal Topped Table – Crime Laboratory



CONTRIBUTIONS OF THE PARTNERS TO THE PRACTICE

- **DOYLE: Criminalistics current awareness
Visualization Specialist**
- **WATSON: Medical current awareness
Ante mortem Specialist**
- **HOLMES: Database compilations/research
Postmortem Specialist**

What are Forensics?

- Forensics are the application of science to those criminal and civil laws which are enforced by police agencies in a criminal justice system.
- Examples of forensic activities are:
 - Criminal (ex.-drugs of abuse, vandalism, theft)
 - Medical (ex.-violent crime, disaster relief)
 - Accounting (ex.-business records, taxes)
 - Document (ex.-handwriting, counterfeiting, chads)
 - Civil (ex.-scientific fraud, auto accidents/blame)
 - Industrial (ex.-chemical accidents, public health)

PHYSICAL FORENSIC INVESTIGATION

- **Locard's Principle (Edmund Locard-1904) states that when a crime is committed there is a cross-transfer of evidence between the scene and the perpetrator.**
- **Forensic investigation (of a crime scene, its physical and imaged evidence, or a computer's hard-drive) endeavors to use science to uncover the transferred evidence and discern its meaning.**
- **The examination requires that the evidence be reliable and accurate to ensure a correct outcome.**

IMAGES AND GRAPHICS (1)

- **Louis Jaques Dagerre (1839) developed the technology of making stable photographs. Gustave Mace used improved technology to make “mug shots” in Paris (1850).**
- **In 1882 Alphonse Bertillon of the Paris Police brought Anthropometry to the records keeping system of the criminalists. The combination of mug shots and physical measurement was a major achievement in organizing data.**

IMAGES AND GRAPHICS (2)

- **About 1895 fingerprints were added to the Bertillon System records folders along with scars, tattoos, and other observable marks. Fingerprints had to wait until it was scientifically established that no two were alike.**
- **In 1910, a student of Bertillon, Dr. Edmond Locard built up the first police lab in Lyon.**

IMAGES AND GRAPHICS (3)

- **Locard was both an MD and a lawyer, and possessed the logical abilities to systematize the comparison and retrieval of records. His laboratory trained many world-class forensic scientists that worked into the post World War II era (1950).**
- **In the early 20th century John Talyer (scientific management) and his students (Henry Gantt) linked time lines and activities together. This invention could deconstruct crimes and accidents to further the linking of gathered evidence to forensic interpretation.**

METHODS OF FORENSIC THINKING

- **REASON-** the thing that makes some fact intelligible; thinking in orderly, rational way
- **DEDUCTIVE-** the deriving of a conclusion by reasoning
- **INDUCTIVE-** of, relating to, or employing mathematical or logical induction
- **INFERENCE-** in which the conclusion about particulars follows necessarily from general or universal premises
- **“INSPIRATIONAL”** - all at once, genius at work

WHAT ARE ANTI-FORENSICS (I)

- **Criminals may use anti-forensic methods to work against the process, or interfere with the evidence itself.**

examples are:

Destroying evidence

Hiding evidence

Eliminating Evidence Sources

Counterfeiting Evidence

Lying, and intimidating witnesses

WHAT ARE ANTI-FORENSICS (II)

- **Evidence is susceptible to:**
 - 1. Attacking the investigator**
 - 2. Dependence on specific tools or processes**
 - 3. Inherent physical and logical limitations of the investigative process and world in general**

WHAT SOLVES A CASE?

- **It is the mind that solves a crime, or reasons out the source of malfeasance from evidence.**
- **The evidence when gathered and examined properly, can be evaluated with logic and deductive reasoning.**
- **Doyle invented the CSI mindset/behavior**

DOCUMENTATION AND “DATABASES”

- **1750-1800 American and French Revolutions**
- **1800-1850 Forensic Science Begins**
- **1850-1900 Forensic Evidence Catalogued**
The Agency Ascendant!
- **1900-1950 Forensic Identifications in Court**
Validated Databases Available
- **1950-2000 Forensic Computerized Databases**
- **2000-Now Terrorists, Criminals, and Whole-
Body Scans and Databases**

Eugene Francois Vidocq (ca. 1775-1850)

- **Master Criminal**
- **Informant**
- **1810 - formed first detective force Paris Sûreté**
- **Founder of the Sûreté's records (ca. 1820)**

The records were compiled, filed, and retrieved only by Vidocq. This is the origin of Sherlock's record keeping system of compiling scrapbooks arranged by his own system.

Bertillon System

- **Bertillon added physical measurement of people over 20 years old to the criminal records; the new technology was called “anthropometry”**
 - **1854 - better, faster, cheaper dry plate photography of inmates replaced daguerreotypes, then film replaced plates.**
 - **1883 – system identifies first recidivist**
 - **1894 - Alfred Dreyfus was wrongly convicted on mistaken handwriting identification by Bertillon.**

FINGERPRINTS AS EVIDENCE (I)

- **1856 – Thumbprint verifies signatures**
- **1877 – prints unique to individuals (ignored)**
- **1880 – fingerprints eliminate suspect**
- **1882 – fingerprint validates pay chits**
- **1892 – first book of fingerprints for forensics**
- **1892 - Argentina replaces anthropometrics with own system of fingerprints**

FINGERPRINTS AS EVIDENCE (2)

- **1896 – First database of prints used in North America and Europe**
- **1901 – Scotland Yard switches from anthropometry to fingerprints**
- **1903 – New York State uses fingerprints for criminal identification**

BOOKS OF INTEREST

- The Victorian Underworld, Donald Thomas, New York University Press, 1998
- The Science of Sherlock Holmes, E.J. Wagner, John Wiley & Sons, 2006

THE GAS LAMP IS OFF

- END

PART TWO

FOOD INDUSTRY FORENSICS

AGRICULTURE SYSTEMS , FURTHER PROCESSING EQUIPMENT, HANDLING

Commodity Processing

Packaging

Distribution to Processors and Renderers, Distillers, Chemical and Drug “Houses”

Processing Plants

Formulated Foods Processors

Packaging and Chemicals

Distribution to Supermarkets, Restaurants, Commissaries, Cafeterias, Military, etc.

Consumer Concerns for Chemical and Microbiological Toxicology, Contaminants

ORIGINS OF FOOD INDUSTRY FORENSICS

Dr. Harvey Washington Wiley

– Systematics of Food Chemistry

- **Dr. Wiley had worked for 20+ years investigating the adulteration of foodstuffs and patent medicines. He was the chief of the Bureau of Chemistry of the of the Department of Agriculture from 1883 to 1912.**
- **“The Jungle” by Upton Sinclair (1906) was the catalyst for passage of the long stalled Pure Food and Drug Act and Meat Inspection Act through Congress on June 30, 1906.**
- **President Theodore Roosevelt hated Sinclair’s Socialist politics, but liked the message due to his experience with bad meat sent to Cuba that poisoned his Rough Riders. (TR had already formed the FBI in 1905.)**

Sherlock Holmes' Contemporaries

- **In the late Victorian and Edwardian era, Sherlock Holmes would have encountered those chemists, biologists, engineers, mathematicians, artists, and business leaders who were developing the basic forensic scientific principles now taught in university classes.**
- **Now, for instance, stains and dyes which were then used to illustrate cell components, now can point to individual molecular types in cells.**

FORENSIC LABORATORIES (I)

- **POLICE LABS – CSI's and Coroner's medical staff gather evidence with rules and legal authority. These staffers may also be trained in specific laboratory techniques of analysis. Documentation-trained, Specialist Scientists in larger labs generally are relied on for research and special, or non-routine workups of the evidence.**

FORENSIC LABORATORIES (II)

- **CONSULTING LABORATORIES** – generally receive evidence/samples through a chain of custody transfer.
- Individuals, or a team of civilian, specialist scientists/technologists are used as an extension of legal authorities' power to examine/interpret the evidence.
- The character and expertise of the consultants has to be documented.
- When completed, the evidence (if not consumed) and reports of examination/opinion are returned to the legal system through a chain of custody process.

CURRENT US BROADCAST TV SHOWS FEATURING FORENSICS

Initiator

CSI Las Vegas – violent crime; profiling and surveillance

- **CSI Miami – violent crime; ballistics and trace**
- **CSI New York – violent crime; databases and trace**
- **Bones – physical anthropology, violent crime; genius**
- **NCIS – military crime and terrorism; pattern recognition**
- **Numbers – FBI violent crime and fraud; pattern analysis**
- **Criminal Minds – violent crime; psychological profiling**

Recently Expired

Crossing Jordan – medical investigation; trace, genius

CONSEQUENCES OF CSI-TYPE STORIES

- **Police and the public expect very rapid turnaround of examinations of every case**
- **Juries expect that the evidence will unfailingly answer every question in black and white**
- **Very expensive equipment and new, lavishly equipped labs and morgues are expected of taxpayers**
- **Like science-fiction, CSI shows are pushing real invention and exploration of elegant techniques**
- **CSI's are beautiful minds in glamorous bodies**

Current Analysis and Development

- From pre-Victorian times until now, science has moved from Sherlock's acid-stained, deal-topped laboratory bench to palatial centers of Research, Development, Information, and Engineering. The movement coincided with the filing of related records together to the rise of computer databases. Databases and rapid Retrieval are now key to the forensic scientist!
- Whereas Sherlock looked for milligrams of toxins we look for atto- and femto- grams (ultra-trace). Ex.- Ricin, and single organism vectors of toxicity (anthrax).