1.2: The History of Forensic Science

SFS1. Students will recognize and classify various types of evidence in relation to the definition and scope of Forensic Science.

a. Compare and contrast the history of scientific forensic techniques used in collecting and submitting evidence for admissibility in court (e.g. Locard's Exchange Principle, Frye standard, Daubert ruling).

8/3/16

Part I: Brief Definition of "Forensics"

- **forensic science** = the application of science to the criminal and civil laws that are enforced by police agencies in a criminal justice system
- **criminalistics** = the application of science to answer questions relating to examination and comparison of physical evidence

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• establish the "corpus delecti"-the body of the crime • establish the "modus operandi"-the method of operation of the crime • support or disprove statements by witnesses, victims or suspects	

Forensics CAN:	Forensics CAN'T:
• establish the "corpus delecti"-the body of the crime • establish the "modus operandi"-the method of operation of the crime • support or disprove statements by witnesses, victims or suspects • link suspect and victim to crime scene and each other. • provide investigative leads • identify or eliminate a suspect	• be 100% certain of anything or be inconclusive • determine guilt or innocence • always analyze all the evidence submitted from a case *And it isn't always easy for non-scientists to understand.* ***So how/when was Forensic Science first used in the study of crime?***

Part II: Early Developments

- **Yi Yu Ji *(Collection of Criminal Cases)*** = 3rd century Chinese manuscript detailing a coroner solved a murder case using pigs:
  - woman was suspected of murdering her husband and then setting a fire to make it look accidental
  - coroner noticed no ashes in the husband's mouth
  - burned 2 pigs—one alive, one dead—then checked for ashes
    - ashes in the mouth of the pig that was alive
    - no ashes in the mouth of the pig that was dead
  - coroner's conclusion: husband was dead BEFORE the fire
  - woman confessed to murder when confronted w/evidence
- the Chinese were also the first to recognize **fingerprints** for identification

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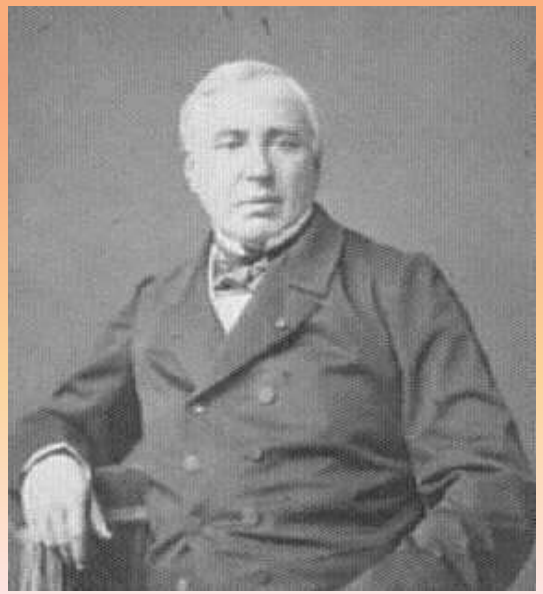
- the Chinese were also the first to recognize **fingerprints** for identification
- **Marcello Malpighi** = professor of Anatomy in Bologna, Italy
  - 1686: first recorded notes about fingerprint characteristics
  - didn't acknowledge fingerprints as a means of identification

Part III: Initial Scientific Advances

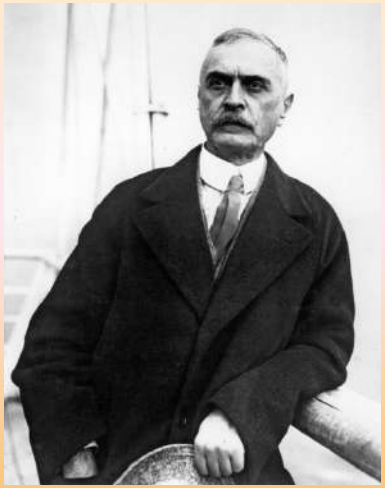
- **Francois-Emanuel Fodéré** = French physician
  - 1798: wrote *A Treatise on Forensic Medicine and Public Health*



Part III: Initial Scientific Advances

- **Francois-Emanuel Fodéré** = French physician
  - 1798: wrote *A Treatise on Forensic Medicine and Public Health*
  - first published paper on forensic science
  - had a greater understanding of workings of the body
- **Carl Wilhelm Scheele** = Swedish chemist
  - 1775: devised the first successful test for detecting arsenic in corpses
  - arsenic was a common poison at the time

- **Valentin Ross** = German chemist
  - 1806: discovered a more precise method for detecting small amounts of arsenic in walls of victims stomach
- **Mathieu Orfila** = Spanish toxicologist
  - considered "Father of Forensic Toxicology"
  - 1814: he published the first scientific treatise on the detection of poisons and their effects on animals
  - established forensic toxicology as a legitimate scientific endeavor
- **1828**: polarizing microscope (William Nichol)
- **1839**: microscopic detection of sperm (Henri-Louis Bayard)

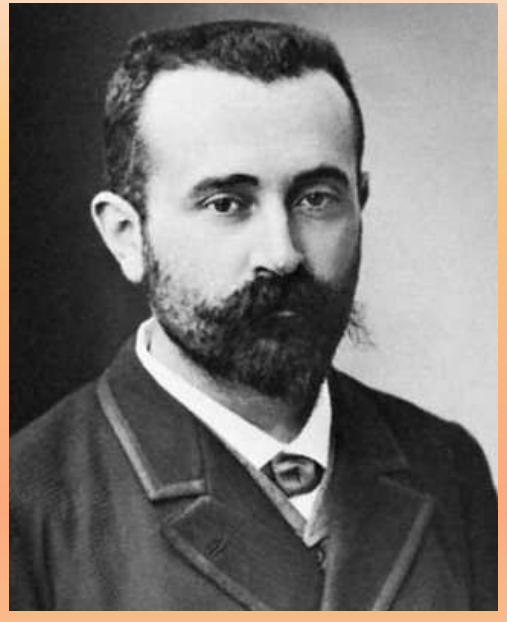


SELF-CHECK QUESTION!

Who was the first individual to make the first test to detect arsenic in dead people?

Carl W. Scheele

- **1839**: microscopic detection of sperm (Henri-Louis Bayard)
- **1853**: microcrystalline test for hemoglobin in blood
- **1863**: presumptive test for blood developed
- **1850s/1860s**: advances in photography used in forensics (images of prisoners, crime scenes)



Part IV: Late 19th-Century Progress

- **Alphonse Bertillon** = French scientist
  - 1897: applied anthropology/morphology to first system of personal identification
  - known as **anthropometry**
  - involved taking a series of body measurements to distinguish one person from another
  - replaced by finger-printing in early 1900s
  - "Father of Criminal Identification"

Bertillon's System (1879) measurements:

1. height
2. reach
3. trunk
4. length of head
5. width of head
6. right ear
7. left foot
8. left middle finger
9. left forearm

- used for 20 years until 2 suspects in a case were found to have the exact same set of measure-ments (Will West case)

SELF-CHECK QUESTIONS!

Who is the Father of Forensic Toxicology?

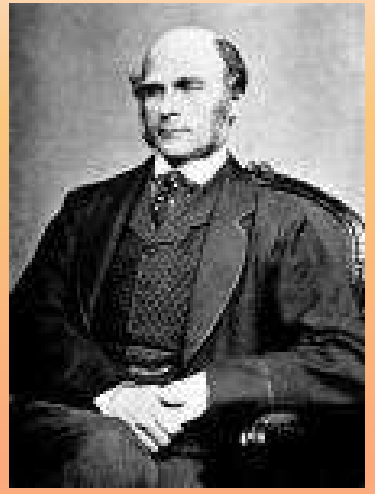
Mathieu Orfila

Who created the first system of personal identification?

Alphonse Bertillon

- **Thomas Taylor/Henry Faulds** = American microscopist/Scottish physician
  - 1877, 1880: suggested that fingerprints could be used as a means of ID

- **Francis Henry Galton** = English scientist
  - first clear study of fingerprints and developed a method of classifying them for filing
  - published a book in 1892 called *Finger Prints*
  - his work is the basis for the finger printing system used now



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  - wrote the first treatise describing the application of scientific fields (and scientific method) to criminal investigations

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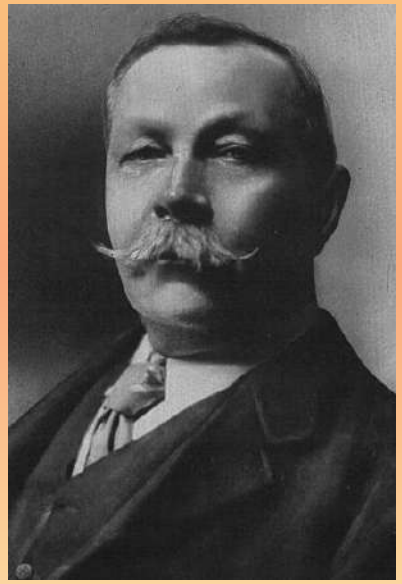
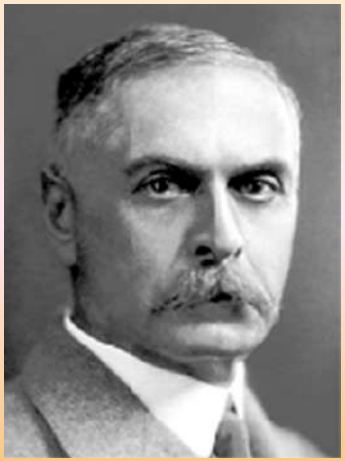
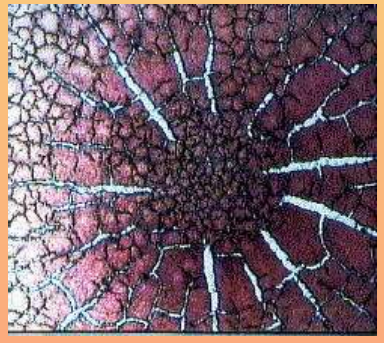
  - 1893: wrote the first treatise describing the application of scientific fields (and scientific method) to criminal investigations
  - spent many years studying/developing of criminal investigation
  - wrote the book *Criminal Investigation* and a forensic journal that is still used today
- **Sir Arthur Conan Doyle** = author, creator of legendary detective Sherlock Holmes (1887-1927)
  - novels starring Holmes & Watson applied principles of serology, fingerprinting, firearms ID, and questioned document examination long before their value was recognized and accepted by real-life investigators



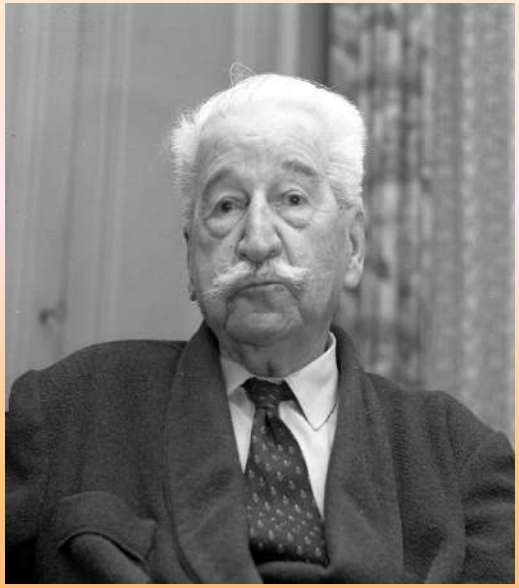
Part V: 20th-Century Breakthroughs

- **Dr. Karl Landsteiner** = Austrian physician
  - 1901: discovered that blood can be grouped into categories: A, B, AB, & O
- **Dr. Leone Lattes** = professor of Forensic Medicine in Italy
  - 1915: created a procedure to determine the blood group of dried blood, which he used in criminal investigations
- **Albert S. Osborn** = handwriting instructor
  - 1910: wrote the first significant text in the *(Questioned Documents)*
  - responsible for acceptance of documents scientific evidence in courts

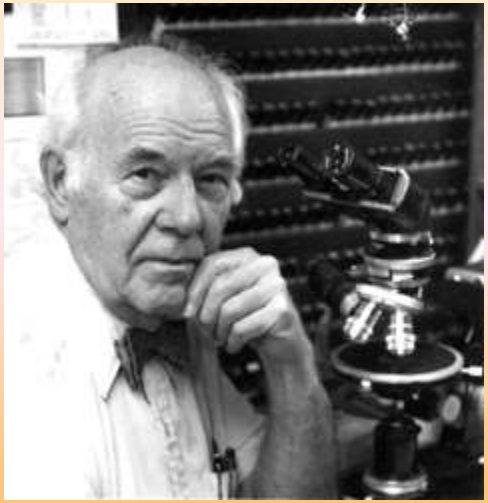




- **Edmond Locard** = medicine & law
  - first to demonstrate how what Gross stated (use of scientific method) could be incorporated within a workable crime lab
  - 1910: persuaded the Lyons, England Police Dept. to let him use two attic rooms and assistants to start a police lab (only had microscope and crude spectrometer)
  - later founded Institute of Criminalistics at Univ. of Lyons
  - **Locard's Exchange Principle** = cross transfer occurs when two materials come into contact with each other (hair, fibers, dust, paint, etc.)



- **Dr. Walter C. McCrone** = American chemist
  - world's preeminent microscopist and sought after Forensics Science instructor
  - educated thousands of forensic scientists in the application of microscopic techniques
  - best known for his work on the Shroud of Turin and the Vinland map (1970s)



- **Army Colonel Calvin Goddard** = weapons expert
  - refined techniques of firearms examination using the comparison microscope
  - technique allows investigators to determine whether a gun has fired a bullet by comparing the bullet with one that has been test-fired from the suspect's weapon

SELF-CHECK QUESTIONS!

Who created the first system for classifying fingerprints?

Francis Henry Galton

Who discovered that blood can be grouped into A, B, AB, & O categories?

Dr. Karl Landsteiner

What is Locard's Exchange Principle?

cross transfer occurs when two materials come into contact with each other