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Forensic Science Timeline updated 2/7/02

- BCE Evidence of fingerprints in early paintings and rock carvings of prehistoric humans
- 700s Chinese used fingerprints to establish identity of documents and clay sculpture, but without any formal classification system.
- (1000) Quintilian, an attorney in the Roman courts, showed that bloody palm prints were meant to frame a blind man of his mother’s murder.
- 1248 A Chinese book, *Hsi Duan Yu* (the washing away of wrongs), contains a description of how to distinguish drowning from strangulation. This was the first recorded application of medical knowledge to the solution of crime.
- 1609 The first treatise on systematic document examination was published by François Demelle of France
- 1686 **Marcello Malpighi**, a professor of anatomy at the University of Bologna, noted fingerprint characteristics. However, he made no mention of their value as a tool for individual identification.
- 1784 In Lancaster, England, **John Toms** was convicted of murder on the basis of the torn edge of wad of newspaper in a pistol matching a remaining piece in his pocket. This was one of the first documented uses of physical matching.
- (1800s) **Thomas Bewick**, an English naturalist, used engravings of his own fingerprints to identify books he published.
- 1810 **Eugène François Vidocq**, in return for a suspension of arrest and a jail sentence, made a deal with the police to establish the first detective force, the Sûreté of Paris.
- 1810 The first recorded use of question document analysis occurred in Germany. A chemical test for a particular ink dye was applied to a document known as the *Konigin Hanschrift*.
- 1813 **Mathiew Orfila**, a Spaniard who became professor of medicinal/forensic chemistry at University of Paris, published *Traite des Poisons Tires des Regnes Mineral, Vegetal et Animal, ou Toxicologie General l*. Orfila is considered the father of modern toxicology. He also made significant contributions to the development of tests for the presence of blood in a forensic context and is credited as the first to attempt the use of a microscope in the assessment of blood and semen stains.
- 1823 **John Evangelist Purkinji**, a professor professor of anatomy at the University of Breslau, Czechoslovakia, published the first paper on the nature of fingerprints and suggested a classification system based on nine major types. However, he failed to recognize their individualizing potential.
- 1828 **William Nichol** invented the polarizing light microscope.
- (1830s) **Adolphe Quetelet**, a Belgian statistician, provided the foundation for Bertillon’s work by stating his belief that no two human bodies were exactly alike.
- 1831 **Leuchs** first noted amylase activity in human saliva.
- 1835 **Henry Goddard**, one of Scotland Yard’s original Bow Street Runners, first used bullet comparison to catch a murderer. His comparison was based on a visible flaw in the bullet which was traced back to a mold.
- 1836 **James Marsh**, an Scottish chemist, was the first to use toxicology (arsenic detection) in a jury trial.

- 1839 **H. Bayard** published the first reliable procedures for the microscopic detection of sperm. He also noted the different microscopic characteristics of various different substrate fabrics.
- 1851 **Jean Servais Stas**, a chemistry professor from Brussels, Belgium, was the first successfully to identify vegetable poisons in body tissue.
- 1853 **Ludwig Teichmann**, in Kracow, Poland, developed the first microscopic crystal test for hemoglobin using hemin crystals.
- 1854 An English physician, **Maddox**, developed dry plate photography, eclipsing **M. Daguerre's** wet plate on tin method. This made practical the photographing of inmates for prison records.
- 1856 **Sir William Herschel**, a British officer working for the Indian Civil service, began to use thumbprints on documents both as a substitute for written signatures for illiterates and to verify document signatures.
- 1862 The Dutch scientist **J. (Izaak) Van Deen** developed a presumptive test for blood using guaiac, a West Indian shrub.
- 1863 The German scientist **Schönbein** first discovered the ability of hemoglobin to oxidize hydrogen peroxide making it foam. This resulted in first presumptive test for blood.
- 1864 **Odelbrecht** first advocated the use of photography for the identification of criminals and the documentation of evidence and crime scenes.
- 1877 **Thomas Taylor**, microscopist to U.S. Department of Agriculture suggested that markings of the palms of the hands and the tips of the fingers could be used for identification in criminal cases. Although reported in the *American Journal of Microscopy and Popular Science* and *Scientific American*, the idea was apparently never pursued from this source.
- 1879 **Rudolph Virchow**, a German pathologist, was one of the first to both study hair and recognize its limitations.
- 1880 **Henry Faulds**, a Scottish physician working in Tokyo, published a paper in the journal *Nature* suggesting that fingerprints at the scene of a crime could identify the offender. In one of the first recorded uses of fingerprints to solve a crime, Faulds used fingerprints to eliminate an innocent suspect and indicate a perpetrator in a Tokyo burglary.
- 1882 **Gilbert Thompson**, a railroad builder with the U.S Geological Survey in New Mexico, put his own thumbprint on wage chits to safeguard himself from forgeries.
- 1883 **Alphonse Bertillon**, a French police employee, identified the first recidivist based on his invention of anthropometry.
- 1887 **Arthur Conan Doyle** published the first Sherlock Holmes story in Beeton's Christmas Annual of London.
- 1889 **Alexandre Lacassagne**, professor of forensic medicine at the University of Lyons, France, was the first to try to individualize bullets to a gun barrel. His comparisons at the time were based simply on the number of lands and grooves.
- 1891 **Hans Gross**, examining magistrate and professor of criminal law at the University of Graz, Austria, published *Criminal Investigation*, the first comprehensive description of uses of physical evidence in solving crime. Gross is also sometimes credited with coining the word *criminalistics*.
- 1892 **(Sir) Francis Galton** published *Fingerprints*, the first comprehensive book on the nature of fingerprints and their use in solving crime.
- 1892 **Juan Vucetich**, an Argentinean police researcher, developed the fingerprint classification system that would come to be used in Latin America. After Vucetich implicated a mother in the murder of her own children using her bloody fingerprints, Argentina was the first country to replace anthropometry with fingerprints.
- 1894 **Alfred Dreyfus** of France was convicted of treason based on a mistaken handwriting identification by **Bertillon**.
- 1896 **Sir Edward Richard Henry** developed the print classification system that would come to be used in Europe and North America. He published *Classification and Uses of Finger Prints*.
- 1898 **Paul Jesrich**, a forensic chemist working in Berlin, Germany, took photomicrographs of two bullets to compare, and subsequently individualize, the minutiae.
- 1901 **Paul Uhlenhuth**, a German immunologist, developed the precipitin test for species. He was also one of the first to institute standards, controls, and QA/QC procedures. **Wassermann** (famous for developing a test for syphilis) and **Schütze** independently discovered and published the precipitin test, but never received due credit.
- 1900 **Karl Landsteiner** first discovered human blood groups and was awarded the Nobel prize for his work in 1930. **Max Richter** adapted the technique to type stains. This is one of the first instances of performing validation experiments specifically to adapt a method for forensic science. **Landsteiner's** continued work on the detection of blood, its species, and its type formed the basis of practically all subsequent work.

- 1901 **Sir Edward Richard Henry** was appointed head of Scotland Yard and forced the adoption of fingerprint identification to replace anthropometry.
- 1901 **Henry P. DeForrest** pioneered the first systematic use of fingerprints in the United States by the New York Civil Service Commission.
- 1902 **Professor R.A. Reiss**, professor at the University of Lausanne, Switzerland, and a pupil of **Bertillon**, set up one of the first academic curricula in forensic science. His forensic photography department grew into Lausanne Institute of Police Science.
- 1903 The New York State Prison system began the first systematic use of fingerprints in United States for criminal identification.
- 1903 At Leavenworth Federal Penitentiary, Kansas, **Will West**, a new inmate, was initially confused with a resident convict William West using anthropometry. They were later (1905) found to be easily differentiated by their fingerprints. For a historical clarification, please see <http://www.scafo.org/library/110105.htm>
- 1904 **Oskar and Rudolf Adler** developed a presumptive test for blood based on benzidine, a new chemical developed by Merk.
- 1905 American President Theodore Roosevelt established **Federal Bureau of Investigation (FBI)**.
- 1910 **Victor Balthazard**, professor of forensic medicine at the Sorbonne, with Marcelle Lambert, published the first comprehensive hair study, *Le poil de l'homme et des animaux*. In one of the first cases involving hairs, Rosella Rousseau was convinced to confess to murder of Germaine Bichon. Balthazard also used photographic enlargements of bullets and cartridge cases to determining weapon type and was among the first to attempt to individualize a bullet to a weapon.
- 1910 **Edmund Locard**, successor to **Lacassagne** as professor of forensic medicine at the University of Lyons, France, established the first police crime laboratory.
- 1910 **Albert S. Osborne**, an American and arguably the most influential document examiner, published *Questioned Documents*.
- 1912 **Masao Takayama** developed another microscopic crystal test for hemoglobin using hemochromogen crystals.
- 1913 **Victor Balthazard**, professor of forensic medicine at the Sorbonne, published the first article on individualizing bullet markings.
- 1915 **Leone Lattes**, professor at the Institute of Forensic Medicine in Turin Italy, developed the first antibody test for ABO blood groups. He first used the test in casework to resolve a marital dispute. He published *L'Individualità del sangue nella biologia, nella clinica, nella medicina, legale*, the first book dealing not only with clinical issues, but heritability, paternity, and typing of dried stains.
- 1915 International Association for Criminal Identification, (to become The **International Association of Identification (IAI)**), was organized in Oakland, California.
- 1916 **Albert Schneider** of Berkeley, California first used a vacuum apparatus to collect trace evidence.
- 1918 **Edmond Locard** first suggested 12 matching points as a positive fingerprint identification.
- 1904 **Locard** published *L'enquete criminelle et les methodes scientifique*, in which appears a passage that may have given rise to the forensic precept that "Every contact leaves a trace."
- 1920 **Charles E. Waite** was the first to catalog manufacturing data about weapons.
- 1920s **Georg Popp** pioneered the use of botanical identification in forensic work.
- 1920s **Luke May**, one of the first American criminalists, pioneered striation analysis in tool mark comparison, including an attempt at statistical validation. In 1930 he published *The identification of knives, tools and instruments, a positive science*, in *The American Journal of Police Science*.
- (1920s) **Calvin Goddard**, with Charles Waite, Phillip O. Gravelle, and John H Fisher, perfected the comparison microscope for use in bullet comparison.
- 1921 **John Larson** and **Leonard Keeler** designed the portable polygraph.
- 1923 **Vittorio Siracusa**, working at the Institute of Legal Medicine of the R. University of Messina, Italy, developed the absorption-elution test for ABO blood typing of stains. Along with his mentor, **Lattes** also performed significant work on the absorption-inhibition technique.
- 1923 In *Frye v. United States*, polygraph test results were ruled inadmissible. The federal ruling introduced the concept of *general acceptance* and stated that polygraph testing did not meet that criterion.

- 1924 **August Vollmer**, as chief of police in Los Angeles, California, implemented the first U.S. police crime laboratory.
- 1925 **Saburo Sirai**, a Japanese scientist, is credited with the first recognition of secretion of group-specific antigens into body fluids other than blood.
- 1926 The case of **Sacco and Vanzetti**, which took place in Bridgewater, Massachusetts, was responsible for popularizing the use of the comparison microscope for bullet comparison. **Calvin Goddard's** conclusions were upheld when the evidence was reexamined in 1961.
- 1927 **Landsteiner** and **Levine** first detected the M, N, and P blood factors leading to development of the MNSs and P typing systems.
- 1928 **Meüller** was the first medico-legal investigator to suggest the identification of salivary amylase as a presumptive test for salivary stains.
- 1929 **K. I. Yosida**, a Japanese scientist, conducted the first comprehensive investigation establishing the existence of serological isoantibodies in body fluids other than blood.
- 1929 **Calvin Goddard's** work on the **St. Valentine's day massacre** led to the founding of the Scientific Crime Detection Laboratory on the campus of Northwestern University, Evanston, Illinois.
- 1930 *American Journal of Police Science* was founded and published by staff of Goddard's Scientific Crime Detection Laboratory in Chicago. In 1932, it was absorbed by *Journal of Criminal Law and Criminology*, becoming the *Journal of Criminal Law, Criminology and police science*.
- 1931 **Franz Josef Holzer**, an Austrian scientist, working at the Institute for Forensic Medicine of the University of Innsbruck, developed the absorption-inhibition ABO typing technique that became the basis of that commonly used in forensic laboratories. It was based on the prior work of **Siracusa** and **Lattes**.
- 1932 **The Federal Bureau of Investigation (FBI)** crime laboratory was created.
- 1935 **Frits Zernike**, a Dutch physicist, invented the first interference contrast microscope, a phase contrast microscope, an achievement for which he won the Nobel prize in 1953.
- 1937 **Holzer** published the first paper addressing the usefulness of secretor status for forensic applications.
- 1937 **Walter Specht**, at the University Institute for Legal Medicine and Scientific Criminalistics in Jena, Germany, developed the chemiluminescent reagent luminol as a presumptive test for blood.
- 1937 **Paul Kirk** assumed leadership of the criminology program at the University of California at Berkeley. In 1945, he formalized a major in technical criminology.
- 1938 **M. Polonovski** and **M. Jayle** first identified haptoglobin.
- 1940 **Landsteiner** and **A.S. Wiener** first described Rh blood groups.
- 1940 **Vincent Hnizda**, a chemist with the Ethyl Corporation, was probably the first to analyze ignitable fluid. He used a vacuum distillation apparatus.
- 1941 **Murray Hill** of Bell Labs initiated the study voiceprint identification. The technique was refined by **L.G. Kersta**.
- 1945 **Frank Lundquist**, working at the Legal Medicine Unit at the University of Copenhagen, developed the acid phosphatase test for semen.
- 1946 **Mourant** first described the Lewis blood group system.
- 1946 **R.R. Race** first described the Kell blood group system
- 1950 **M. Cutbush**, and colleagues first described the Duffy blood group system.
- 1950 **August Vollmer**, chief of police of Berkeley, California, established the school of criminology at the University of California at Berkeley. **Paul Kirk** presided over the major of criminalistics within the school..
- 1950 **Max Frei-Sulzer**, founder of the first Swiss criminalistics laboratory, developed the tape lift method of collecting trace evidence.
- 1950 The **American Academy of Forensic Science (AAFS)** was formed in Chicago, Illinois. The group also began publication of the **Journal of Forensic Science (JFS)**.
- 1951 **F. H. Allen** and colleagues first described the Kidd blood grouping system.
- 1953 **Kirk** published *Crime Investigation*, one of the first comprehensive criminalistics and crime investigation texts that encompassed theory in addition to practice.
- 1954 **R. F. Borkenstein**, captain of the Indiana State Police, invented the Breathalyzer for field sobriety testing.

- 1958 **A. S. Weiner** and colleagues introduced the use of H-lectin to determine positively O blood type.
- 1959 Hirshfeld first identified the polymorphic nature of group specific component (Gc).
- 1960 **Lucas**, in Canada, described the application of gas chromatography (GC) to the identification of petroleum products in the forensic laboratory and discussed potential limitations in the brand identity of gasoline.
- 1960s **Maurice Muller**, a Swiss scientist, adapted the Ouchterlony antibody-antigen diffusion test for precipitin testing to determine species.
- 1963 **D.A. Hopkinson** and colleagues first identified the polymorphic nature of erythrocyte acid phosphatase (EAP).
- 1964 **N. Spencer** and colleagues first identified the polymorphic nature of red cell phosphoglucomutase (PGM).
- 1966 **R. A. Fildes** and **H. Harris** first identified the polymorphic nature of red cell adenylate cyclase (AK).
- 1966 **Brian J. Culliford** and **Brian Wrxall** developed the immunoelectrophoretic technique for haptoglobin typing in bloodstains.
- 1967 **Culliford**, of the British Metropolitan Police Laboratory, initiated the development of gel-based methods to test for isoenzymes in dried bloodstains. He was also instrumental in the development and dissemination of methods for testing proteins and isoenzymes in both blood and other body fluids and secretions.
- 1968 **Spencer** and colleagues first identified the polymorphic nature of red cell adenosine deaminase (ADA).
- 1971 **Culliford** published *The Examination and Typing of Bloodstains in the Crime Laboratory*, generally accepted as responsible for disseminating reliable protocols for the typing of polymorphic protein and enzyme markers to the United States and worldwide.
- 1973 **Hopkinson** and colleagues first identified the polymorphic nature of esterase D (ESD).
- 1974 The detection of gunshot residue (GSR) using scanning electron microscopy with electron dispersive X-rays (SEM-EDX) technology was developed by **J. E. Wessel**, **P. F. Jones**, **Q. Y. Kwan**, **R. S. Nesbitt** and **E. J. Rattin** at Aerospace Corporation.
- 1975 **J. Kompf** and colleagues, working in Germany, first identified the polymorphic nature of red cell glyoxylase (GLO).
- 1975 The **Federal Rules of Evidence**, originally promulgated by the U.S. Supreme Court, were enacted as a congressional statute. They are based on the *relevancy standard* in which scientific evidence that is deemed more prejudicial than probative may not be admitted.
- 1976 **Zoro** and **Hadley** in the United Kingdom first evaluated GC-MS for forensic purposes.
- 1977 **Fuseo Matsumur**, a trace evidence examiner at the Saga Prefectural Crime Laboratory of the National Police Agency of Japan, notices his own fingerprints developing on microscope slides while mounting hairs from a taxi driver murder case. He relates the information to co-worker Masato Soba, a latent print examiner. Soba would later that year be the first to develop latent prints intentionally by “Superglue[®]” fuming.
- (1977) The *fourier transform infrared spectrophotometer (FTIR)* is adapted for use in the forensic laboratory.
- (1977) The **FBI** introduced the beginnings of its *Automated Fingerprint Identification System (AFIS)* with the first computerized scans of fingerprints.
- 1978 **Brian Wrxall** and **Mark Stolorow** developed the “multisystem” method for testing the PGM, ESD, and GLO isoenzyme systems simultaneously. They also developed methods for typing blood serum proteins such as haptoglobin and Gc.
- 1984 **(Sir) Alec Jeffreys** developed the first DNA profiling test. It involved detection of a multilocus RFLP pattern. He published his findings in *Nature* in 1985.
- 1986 In the first use of DNA to solve a crime, **Jeffreys** used DNA profiling to identify Colin Pitchfork as the murderer of two young girls in the English Midlands. Significantly, in the course of the investigation, DNA was first used to exonerate an innocent suspect.
- 1983 The polymerase chain reaction (PCR) was first conceived by **Kerry Mullis**, while he was working at **Cetus** Corporation. The first paper on the technique was not published until 1985.
- 1986 The human genetics group at **Cetus** Corporation, led by **Henry Erlich**, developed the PCR technique for a number of clinical and forensic applications. This resulted in development of the first commercial PCR typing kit specifically for forensic use, HLA DQ α (DQA1), about 2 years later.
- 1986 In *People v. Pestnikas*, Edward Blake first used PCR-based DNA testing (HLA DQ α) , to confirm different autopsy samples to be from the same person. The evidence was accepted by a civil court. This was also the first use of any kind of DNA testing in the United States

- 1987 DNA profiling was introduced for the first time in a U.S. criminal court. Based on RFLP analysis performed by **Lifecodes**, **Tommy Lee Andrews** was convicted of a series of sexual assaults in Orlando, Florida.
- 1987 *New York v. Castro* was the first case in which the admissibility of DNA was seriously challenged. It set in motion a string of events that culminated in a call for certification, accreditation, standardization, and quality control guidelines for both DNA laboratories and the general forensic community.
- 1988 **Lewellen, McCurdy, and Horton**, and **Asselin, Leslie, and McKinley** both publish milestone papers introducing a novel procedure for the analysis of drugs in whole blood by *homogeneous enzyme immunoassay (EMIT)*.
- 1990 **K. Kasai** and colleagues published the first paper suggesting the D1S80 locus (pMCT118) for forensic DNA analysis. D1S80 was subsequently developed by **Cetus** (subsequently Roche Molecular Systems) corporation as a commercially available forensic DNA typing system.
- 1992 In response to concerns about the practice of forensic DNA analysis and interpretation of the results, the National Research Council Committee on Forensic DNA (**NRC I**) published *DNA Technology in Forensic Science*.
- 1992 **Thomas Caskey**, professor at Baylor University in Texas, and colleagues published the first paper suggesting the use of short tandem repeats for forensic DNA analysis. **Promega** corporation and **Perkin-Elmer** corporation in collaboration with **Roche Molecular Systems** independently developed commercial kits for forensic DNA STR typing.
- 1991 **Walsh Automation Inc.**, in Montreal, launched development of an automated imaging system called the *Integrated Ballistics Identification System*, or *IBIS*, for comparison of the marks left on fired bullets, cartridge cases, and shell casings. This system was subsequently developed for the U.S. market in collaboration with the **Bureau of Alcohol, Tobacco, and Firearms (ATF)**.
- 1992 The **FBI** contracted with **Mnemonic Systems** to develop *Drugfire*, an automated imaging system to compare marks left on cartridge cases and shell casings. The ability to compare fired bullets was subsequently added.
- 1993 In *Daubert et al. v. Merrell Dow*, a U.S. federal court relaxed the Frye standard for admission of scientific evidence and conferred on the judge a “gatekeeping” role. The ruling cited Karl Popper’s views that scientific theories are falsifiable as a criterion for whether something is “scientific knowledge” and should be admissible.
- (1994) **Roche Molecular Systems** (formerly Cetus) released a set of five additional DNA markers (“polymarker”) to add to the HLA-DQA1 forensic DNA typing system.
- 1996 In response to continued concerns about the statistical interpretation of forensic DNA evidence, a second National Research Council Committee on Forensic DNA (**NRC II**) was convened and published *The Evaluation of Forensic DNA Evidence*.
- 1996 The **FBI** introduced computerized searches of the *AFIS* fingerprint database. Live scan and card scan devices allowed interdepartmental submissions.
- 1996 In *Tennessee v. Ware*, mitochondrial DNA typing was admitted for the first time in a U.S. court.
- 1998 An FBI DNA database, *NIDIS*, enabling interstate cooperation in linking crimes, was put into practice.
- 1999 The FBI upgraded its computerized fingerprint database and implemented the *Integrated Automated Fingerprint Identification System (IAFIS)*, allowing paperless submission, storage, and search capabilities directly to the national database maintained at the FBI.
- 1999 A Memorandum of Understanding is signed between the FBI and ATF, allowing the use of the *National Integrated Ballistics Network (NIBIN)*, to facilitate exchange of firearms data between *Drugfire* and *IBIS*.

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