The History of Fingerprints

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Why Fingerprint Identification?

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The science of fingerprint identification stands out among all other forensic sciences for many reasons, including the following:

- Has served governments worldwide for over 100 years to provide accurate identification of criminals. No two fingerprints have ever been found alike in many billions of human and automated computer comparisons. Fingerprints are the very basis for criminal history foundation at every police agency on earth.
- Established the first forensic professional organization, the International Association for Identification (IAI), in 1915.
- Established the first professional certification program for forensic scientists, the IAI’s Certified Latent Print Examiner program (in 1977), issuing certification to those meeting stringent criteria and revoking certification for serious errors such as erroneous identifications.
- Remains the most commonly used forensic evidence worldwide - in most jurisdictions fingerprint examination cases match or outnumber all other forensic examination casework combined.
- Continues to expand as the premier method for positively identifying persons, with tens of thousands of persons added to fingerprint repositories daily in America alone - far outdistancing similar databases in growth.
- Worldwide, fingerprints harvested from crime "scenes lead to more suspects and generate more evidence in court than all other forensic laboratory techniques combined."²

Other visible human characteristics tend to change - fingerprints do not. Barring injuries or surgery causing deep scarring, or diseases such as leprosy damaging the formative layers of friction ridge skin (injuries, scarring and diseases tend to exhibit telltale indicators of unnatural change), finger and palm print features have never been shown to move about or change their unit relationship throughout the life of a person.

In earlier civilizations, branding and even maiming were used to mark the criminal for what he or she was. The thief was deprived of the hand which committed the thievery. Ancient Romans employed the tattoo needle to identify and prevent desertion of mercenary soldiers from their ranks.

Before the mid-1800s, law enforcement officers with extraordinary visual memories, so-called "camera eyes," identified previously arrested offenders by sight. Photography lessened the burden on memory but was not the answer to the criminal identification problem. Personal appearances change.

Around 1870, French anthropologist Alphonse Bertillon devised a system to measure and record the dimensions of certain bony parts of the body. These measurements were reduced to a formula which, theoretically, would apply only to one person and would not change during his/her adult life.

The Bertillon System was generally accepted for thirty years. But it never recovered from the events of 1903, when a man named Will West was sentenced to the U.S. Penitentiary at Leavenworth, Kansas. It was discovered that there was already a prisoner at the penitentiary at the time, whose Bertillon measurements were nearly the same, and his name was William West.
Upon investigation, there were indeed two men who looked exactly alike. Their names were Will and William West respectively. Their Bertillon measurements were close enough to identify them as the same person. However, a fingerprint comparison quickly and correctly identified them as two different people. (Per prison records discovered later, the West men were apparently identical twin brothers and each had a record of correspondence with the same immediate family relatives.)

Prehistoric
Picture writing of a hand with ridge patterns was discovered in Nova Scotia. In ancient Babylon, fingerprints were used on clay tablets for business transactions. In ancient China, thumb prints were found on clay seals.
In 14th century Persia, various official government papers had fingerprints (impressions), and one government official, a doctor, observed that no two fingerprints were exactly alike.

1686 - Malpighi
In 1686, Marcello Malpighi, an anatomy professor at the University of Bologna, noted in his treatise; ridges, spirals and loops in fingerprints. He made no mention of their value as a tool for individual identification. A layer of skin was named after him; "Malpighi" layer, which is approximately 1.8mm thick.

1823 - Purkinje
In 1823, John Evangelist Purkinje, an anatomy professor at the University of Breslau, published his thesis discussing nine fingerprint patterns, but he too made no mention of the value of fingerprints for personal identification.

1858 - Herschel
The English first began using fingerprints in July of 1858, when Sir William James Herschel, Chief Magistrate of the Hooghly district in Jungipoor, India, first used fingerprints on native contracts. On a whim, and without thought toward personal identification, Herschel had Rajyadhar Konai, a local businessman, impress his hand print on a contract.

The idea was merely "... to frighten [him] out of all thought of repudiating his signature." The native was suitably impressed, and Herschel made a habit of requiring palm prints--and later, simply the prints of the right Index and Middle fingers--on every contract made with the locals. Personal contact with the document, they believed, made the contract more binding than if they simply signed it. Thus, the first wide-scale, modern-day use of fingerprints was predicated, not upon scientific evidence, but upon superstitious beliefs.

As his fingerprint collection grew, however, Herschel began to note that the inked impressions could, indeed, prove or disprove identity. While his experience with fingerprinting was admittedly limited, Sir William Herschel's private conviction that all fingerprints were unique to the individual, as well as permanent throughout that individual's life, inspired him to expand their use.

Herschel's fingerprints recorded over a period of 57 years.
1863 - Coulier
Professor Paul-Jean Coulier, of Val-de-Grâce in Paris, publishes his observations that (latent) fingerprints can be developed on paper by iodine fuming, explains how to preserve (fix) such developed impressions and mentions the potential for identifying suspects' fingerprints by use of a magnifying glass.

1880 - Faulds - First Latent Print Identification
During the 1870s, Dr. Henry Faulds, the British Surgeon-Superintendent of Tsukiji Hospital in Tokyo, Japan, took up the study of "skin-furrows" after noticing finger marks on specimens of "prehistoric" pottery. A learned and industrious man, Dr. Faulds not only recognized the importance of fingerprints as a means of identification, but devised a method of classification as well.

In 1880, Faulds forwarded an explanation of his classification system and a sample of the forms he had designed for recording inked impressions, to Sir Charles Darwin. Darwin, in advanced age and ill health, informed Dr. Faulds that he could be of no assistance to him, but promised to pass the materials on to his cousin, Francis Galton.

Also in 1880, Dr. Henry Faulds published an article in the Scientific Journal, "Nature" (nature). He discussed fingerprints as a means of personal identification, and the use of printers ink as a method for obtaining such fingerprints. He is also credited with the first fingerprint identification of a greasy fingerprint left on an alcohol bottle.

1882 - Thompson
In 1882, Gilbert Thompson of the U.S. Geological Survey in New Mexico, used his own thumb print on a document to prevent forgery. This is the first known use of fingerprints in the United States. Click the image below to see a larger image of an 1882 receipt issued by Gilbert Thompson to "Lying Bob" in the amount of 75 dollars.

1882 - Bertillon
Alphonse Bertillon, a Clerk in the Prefecture of Police of at Paris, France, devised a system of classification, known as Anthropometry or the Bertillon System, using measurements of parts of the body. Bertillon's system included measurements such as head length, head width, length of the middle finger, length of the left foot; and length of the forearm from the elbow to the tip of the middle finger.

In 1888 Bertillon was made Chief of the newly created Department of Judicial Identity where he used anthropometry as the primary means of identification. He later introduced Fingerprints but relegated them to a secondary role in the category of special marks.

1883 - Mark Twain (Samuel L. Clemens)
In Mark Twain's book, "Life on the Mississippi", a murderer was identified by the use of fingerprint identification. In a later book, "Pudd'n Head Wilson", there was a dramatic court trial on fingerprint identification. A movie was made from this book in 1916 and a made-for-TV movie in 1984.

1888 - Galton
Sir Francis Galton, a British anthropologist and a cousin of Charles Darwin, began his observations of fingerprints as a means of identification in the 1880's.
1891 - Vucetich
Juan Vucetich, an Argentine Police Official, began the first fingerprint files based on Galton pattern types. At first, Vucetich included the Bertillon System with the files. Right Thumb Impression and Signature of Juan Vucetich.

1892 - Vucetich & Galton
Juan Vucetich made the first criminal fingerprint identification in 1892. He was able to identify Francis Rojas, a woman who murdered her two sons and cut her own throat in an attempt to place blame on another. Her bloody print was left on a door post, proving her identity as the murderer.


Galton's primary interest in fingerprints was as an aid in determining heredity and racial background. While he soon discovered that fingerprints offered no firm clues to an individual's intelligence or genetic history, he was able to scientifically prove what Herschel and Faulds already suspected: that fingerprints do not change over the course of an individual's lifetime, and that no two fingerprints are exactly the same. According to his calculations, the odds of two individual fingerprints being the same were 1 in 64 billion. Galton identified the characteristics by which fingerprints can be identified. A few of these same characteristics (minutia) are basically still in use today, and are sometimes referred to as Galton Details.

1897 - Haque & Bose
On 12 June 1897, the Council of the Governor General of India approved a committee report that fingerprints should be used for classification of criminal records. Later that year, the Calcutta (now Kolkata) Anthropometric Bureau became the world's first Fingerprint Bureau. Working in the Calcutta Anthropometric Bureau (before it became the Fingerprint Bureau) were Azizul Haque and Hem Chandra Bose. Haque and Bose are the two Indian fingerprint experts credited with primary development of the Henry System of fingerprint classification (named for their supervisor, Edward Richard Henry). The Henry classification system is still used in English-speaking countries (primarily as the manual filing system for accessing paper archive files that have not been scanned and computerized).

1900 - Henry
The United Kingdom Home Secretary Office conducted an inquiry into "Identification of Criminals by Measurement and Fingerprints." Mr. Edward Richard Henry (later Sir ER Henry) appeared before the inquiry committee to explain the system published in his recent book "The Classification and Use of Fingerprints." The committee recommended adoption of fingerprinting as a replacement for the relatively inaccurate Bertillon system of anthropometric measurement, which only partially relied on fingerprints for identification.

1901 - Henry
The Fingerprint Branch at New Scotland Yard (London Metropolitan Police) was created in July 1901 using the Henry System of Fingerprint Classification.

1902
First systematic use of fingerprints in the U.S. by the New York Civil Service Commission for testing. Dr. Henry P. DeForrest pioneers U.S. fingerprinting.
1903
The New York State Prison system began the first systematic use of fingerprints in the U.S. for criminals.

1904
The use of fingerprints began in Leavenworth Federal Penitentiary in Kansas, and the St. Louis Police Department. They were assisted by a Sergeant from Scotland Yard who had been on duty at the St. Louis World's Fair Exposition guarding the British Display. Sometime after the St. Louis World's Fair, the International Association of Chiefs of Police (IACP) created America's first national fingerprint repository, called the National Bureau of Criminal Identification.

1905
U.S. Army begins using fingerprints.
U.S. Department of Justice forms the Bureau of Criminal Identification in Washington, DC to provide a centralized reference collection of fingerprint cards.

Two years later the U.S. Navy started, and was joined the next year by the Marine Corp. During the next 25 years more and more law enforcement agencies join in the use of fingerprints as a means of personal identification. Many of these agencies began sending copies of their fingerprint cards to the National Bureau of Criminal Identification, which was established by the International Association of Police Chiefs.

1907
U.S. Navy begins using fingerprints.
U.S. Department of Justice's Bureau of Criminal Identification moves to Leavenworth Federal Penitentiary where it is staffed at least partially by inmates.

1908
U.S. Marine Corps begins using fingerprints.

1915
Inspector Harry H. Caldwell of the Oakland, California Police Department's Bureau of Identification wrote numerous letters to "Criminal Identification Operators" in August 1915, requesting them to meet in Oakland for the purpose of forming an organization to further the aims of the identification profession. In October 1915, a group of twenty-two identification personnel met and initiated the "International Association for Criminal Identification" In 1918, the organization was renamed the International Association for Identification (IAI) due to the volume of non-criminal identification work performed by members. Sir Francis Galton's right index finger appears in the IAI logo. The IAI's official publication is the Journal of Forensic Identification.

1918
Edmond Locard wrote that if 12 points (Galton's Details) were the same between two fingerprints, it would suffice as a positive identification. Locard's 12 points seems to have been based on an unscientific "improvement" over the eleven anthropometric measurements (arm length, height, etc.) used to "identify" criminals before the adoption of fingerprints.

1924
In 1924, an act of congress established the Identification Division of the FBI. The IACP's National Bureau of Criminal Identification and the US Justice Department's Bureau of Criminal Identification consolidated to form the
nucleus of the FBI fingerprint files.

1946
By 1946, the FBI had processed 100 million fingerprint cards in manually maintained files; and by 1971, 200 million cards.
With the introduction of automated fingerprint identification system (AFIS) technology, the files were split into computerized criminal files and manually maintained civil files. Many of the manual files were duplicates though, the records actually represented somewhere in the neighborhood of 25 to 30 million criminals, and an unknown number of individuals in the civil files.

1974
In 1974, four employees of the Hertfordshire (United Kingdom) Fingerprint Bureau contacted fingerprint experts throughout the UK and began organization of that country's first professional fingerprint organization, the National Society of Fingerprint Officers. The organization initially consisted of only UK experts, but quickly expanded to international scope and was renamed The Fingerprint Society in 1977. The initials F.F.S. behind a fingerprint expert's name indicates they are recognized as a Fellow of the Fingerprint Society. The Society hosts annual educational conferences with speakers and delegates attending from many countries.

1977
At New Orleans, Louisiana on 1 August 1977, delegates to the 62nd Annual Conference of the International Association for Identification (IAI) voted to establish the world's first certification program for fingerprint experts. Since 1977, the IAI's Latent Print Certification Board has proficiency tested thousands of applicants, and periodically proficiency tests all IAI Certified Latent Print Examiners (CLPEs). Contrary to claims (in the 1990s and later) that fingerprint experts profess their body of practitioners never make erroneous identifications, the Latent Print Certification program proposed, adopted, and in-force since 1977, specifically recognizes that such mistakes do sometimes occur, and must be addressed by the Latent Print Certification Board.
During the past three decades, CLPE status has become a prerequisite for journeyman fingerprint expert positions in many US state and federal government forensic laboratories. IAI CLPE status is considered by many identification professionals to be a measurement of excellence.

2012
The world's largest annual meeting of fingerprint experts is hosted by the IAI - this year it will be during 22-28 July in Phoenix, Arizona, USA.

2012
INTERPOL's Automated Fingerprint Identification System repository exceeds 150,000 sets fingerprints for important international criminal records from 190 member countries. Over 170 countries have 24 x 7 interface ability with INTERPOL expert fingerprint services.

2012 - America's Largest Database
The largest AFIS repository in America is operated by the Department of Homeland Security's US Visit Program, containing over 120 million persons' fingerprints, many in the form of two-finger records. The two-finger records are non-compliant with FBI and Interpol standards, but sufficient for positive identification and valuable for forensics because index fingers and thumbs are the most commonly identified crime scene fingerprints. The US
Visit Program has been migrating from two flat (not rolled) fingerprints to ten flat fingerprints since 2007. "Fast capture" research will hopefully enable implementation of ten "rolled print equivalent" fingerprint recording (within 15 seconds per person fingerprinted) in future years.

The largest tenprint AFIS repository in America is the FBI's Integrated AFIS (IAFIS) in Clarksburg, WV. IAFIS has more than 60 million individual computerized fingerprint records (both criminal and civil applicant records). Old paper fingerprint cards for the civil files are still manually maintained in a warehouse facility (rented shopping center space) in Fairmont, WV, though most enlisted military service member fingerprint cards received after 1990, and all military-related fingerprint cards received after 19 May 2000, have now been computerized and can be searched internally by the FBI. In "Next Generation Identification," the FBI may make civil file AFIS searches available to US law enforcement agencies through remote interface. The FBI is also planning to eventually expand their automated identification activities to include other biometrics such as palm, iris and face.

All US states and many large cities have their own AFIS databases, each with a subset of fingerprint records that is not stored in any other database. Many also store and search palmprints. Law enforcement fingerprint interface standards are important to enable sharing records and reciprocal searches to identify criminals.

**Interpol**, the European Union's Prüm Treaty, the FBI's Next Generation Identification and other initiatives seek to improve cross-jurisdiction sharing (probing and sharing/pushing) of important finger and palm print data to identify criminals.

### 2012 - World's Largest Database

As of May 2012, the Unique Identification Authority of India operates the world's largest fingerprint (multi-modal biometric) system, with over 200 million fingerprint, face and iris biometric records. UIAI plans to collect as many as 600 million multi-modal record by the end of 2014. India's Unique Identification project is also known as Aadhaar, a word meaning "the foundation" in several Indian languages. Aadhaar is a voluntary program, with the ambitious goal of eventually providing reliable national ID documents for most of India's 1.2 billion residents. With a database many times larger than any other in the world, Aadhaar's ability to leverage automated fingerprint and iris modalities (and potentially automated face recognition) enables rapid and reliable automated searching and identification impossible to accomplish with fingerprint technology alone, especially when searching children and elderly residents' fingerprints.

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1. Some of the above wording is credited to the writing of Greg Moore, from his previous fingerprint history page at [http://www.brawleyonline.com/consult/history.htm](http://www.brawleyonline.com/consult/history.htm) (no longer there). Also, David L. von Minden, Ph.D helped correct typos his students kept cutting and pasting into their homework.